GRINDING and FINISHING

APRIL 1959

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Buffing at Ford's Monroe Plant

Central Coolant Systems--Cure or Curse

Honeycomb Cores--Ground not Milled

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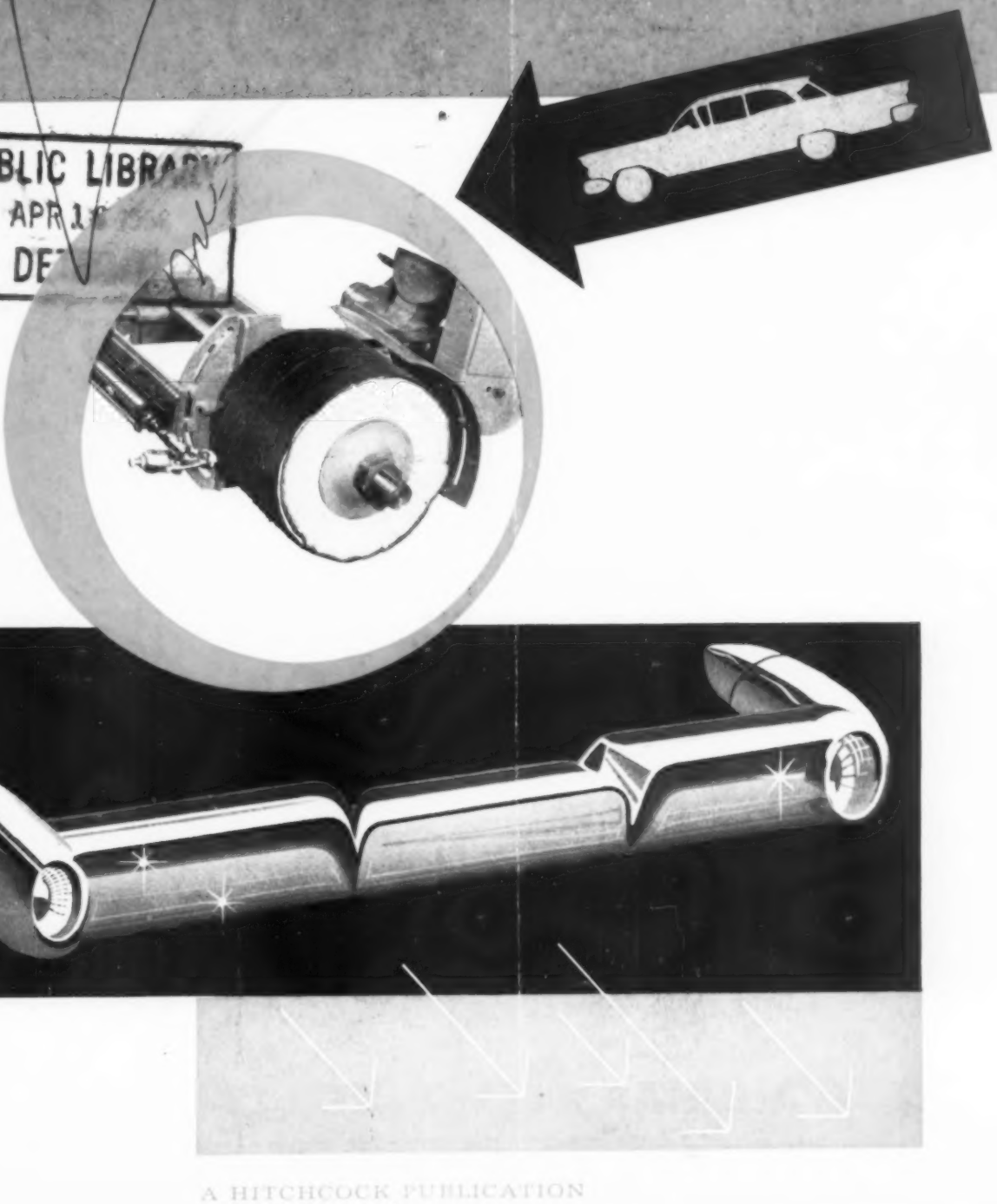

A HITCHCOCK PUBLICATION

This valve gets a leak-proof seal from a Blanchard Surface Grinder

"The Blanchard Surface Grinder is one of the most important improvements in our modernization program." This report comes from the Commercial Refrigeration Division of Bendix-Westinghouse Automotive Air Brake Company—makers of power and condensing units for refrigeration equipment.

The Blanchard No. 18 Surface Grinder puts a surface of 5 micro inches or better on Bendix-Westinghouse valves at the rate of 75 pieces an hour.

A Blanchard Model 18 Surface Grinder is used to finish grind valve plates used in Bendix-Westinghouse electric refrigeration compressors. They say: "This operation is very important, because—with a surface finish of five micro inches or better—we get a perfect seal on our gaskets and valves, eliminating the possibility of leakage."

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WHEREVER ABRASIVE OPERATIONS ARE PERFORMED

GRINDING and FINISHING

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APRIL COVER: Even in an automatic set-up, buffing retains many of the characteristics of an art. Finding the proper combination of wheels and buffing compounds to produce the surface required for plating is only one of the problems. The gleaming bumper which results, as shown here, is in its way a work of art. It takes little away from it that it is only one of thousands, rather than a single masterpiece.

NEXT MONTH: Mounted wheels make up a unique subdivision of the abrasive industry, probably have a greater variety of uses than any other type of wheel. While covering the fundamentals of their use, this article also describes and shows some of their off-beat applications.

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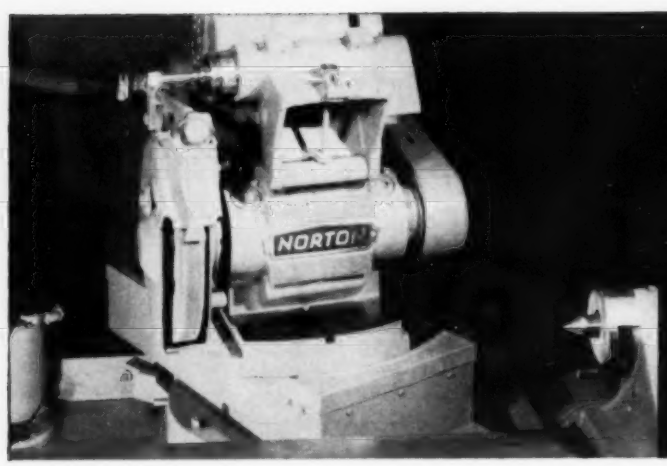
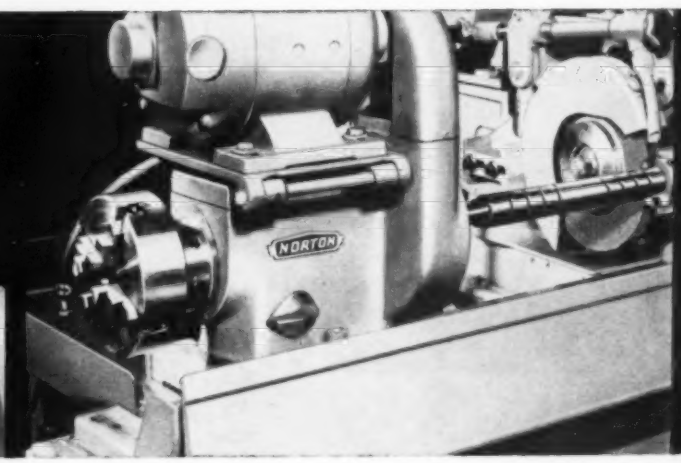
Norton Universal Grinders do more...save more



The flexible grinding wheel head swivels above and below the slideways, permitting independent angular settings of wheel and feed — giving you the widest job range.



You can change from dead center to chucking work with minimum effort. Chuck remains mounted at back end of headstock when grinding "on centers".

A Norton 12" Type U-4 Universal Grinder, available with 36" or 48" nominal lengths between centers, typical of Norton Universals.

Install any Norton Universal Grinder and you've got a practically complete grinding department — for faster external, internal, face, taper and angular wheelslide grinding, including many special jobs. That's because Norton builds exceptional versatility into all these famous universals, with time-and-money-saving "Touch of Gold" advantages like the following:

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Engineered for long service life in handling so many different jobs, Norton Universal Grinders are easy to operate and maintain. Their swing capacities range from 10" to 18". Your Norton Sales Engineer, a trained expert in the grinding field, will be glad to help you select the size you need — and to give you an accurate estimate of what this grinder can do for you. NORTON COMPANY, Machine Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

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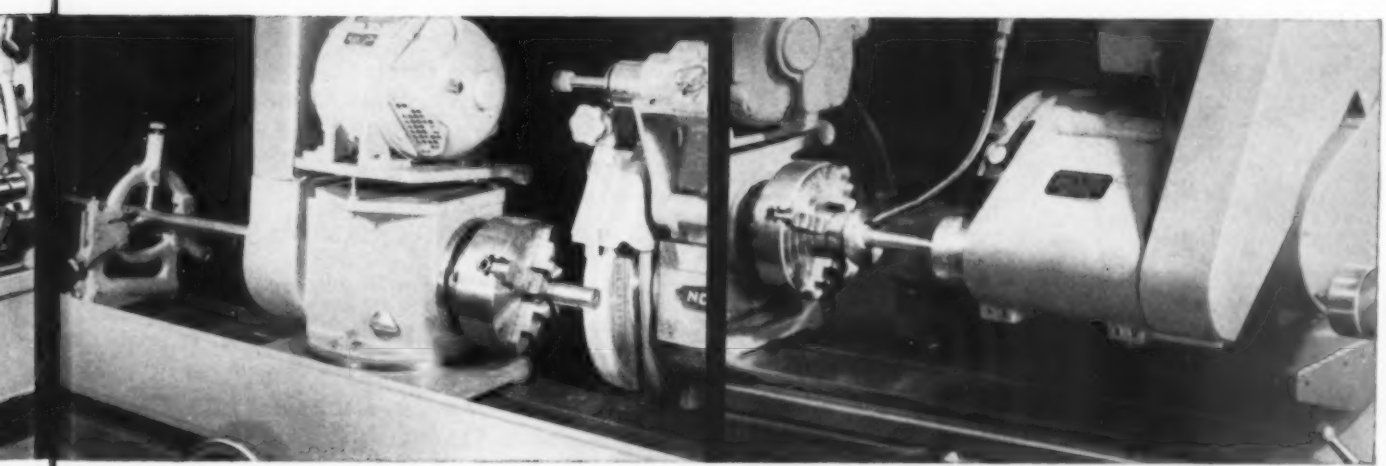

Hollow headstock spindle gives you additional capacity for grinding long bars by passing them clear through and supporting them in grinding position.

Hinged-bracket type internal grinding spindle swings up and out of the way when not in use. This means quicker set-ups for your I.D. or O.D. grinding.

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Editor's Mail

On Our New Format

The February issue of GRINDING and FINISHING has been received and we wish to compliment you on the new format. The changes that have been made are an improvement particularly in appearance and reading.

Thos. F. Haley, Vice-Pres.-Finance
Cortland Grinding Wheels Corp.
Chester, Mass.

I am very much impressed with the February issue of GRINDING and FINISHING and I wish to compliment you on your new format.

Hitchcock Publishing Co. is to be complimented for the very fine job they have done for the abrasive industry and you have my very best wishes for continued success.

Robert C. Franklin, Pres.
Macklin Co.
Jackson, Mich.

Man-Made Diamonds

We will appreciate very much your mailing to us six tear sheets of the following article published in the February 1959 issue of GRINDING and FINISHING, "How Good Are Man-Made Diamonds," by Chester A. Nisula. We find the information of great interest in our work as consultants.

Philip Brown, Sec'y. and Asst. Treas.
Engineering Supervision Co.
New York, N.Y.

Centerless Grinding

I am engaged in a research paper as part of my studies as a senior student at Pratt Institute. This paper involves an understanding of the principles and techniques of centerless grinding. I ran across the series of articles that you published in your magazine, GRINDING and FINISHING, between December 1955 and April 1956 and found them very fine for my purpose. I am writing to discover if it is possible to purchase these articles separately as a unit. . . .

Jan Sand
Brooklyn, N.Y.

Diamond Bits

Please let us know if we can purchase six reprints of the article, "Thin Wall Diamond Bits for Hard Materials," by W. H. Hampton, page 42, your issue of January 1959.

Michael Werdiger
Michael Werdiger, Inc.
New York, N.Y.

We should be glad if you would grant us permission to reprint W. H. Hampton's article on "Thin Wall Diamond Bits for Hard Materials" which appeared on pages 42-43 of your January issue. If you give permission to reprint, we should also like to borrow the illustrations.

A full acknowledgment to your journal would, of course, appear with our reprint.

Patrick Greene
Industrial Diamond Review
London, England

International Harvester Cuts Grinding Costs

Thank you for the tear sheets of the second part of Jules Caldwell's story on tool grinding costs . . . We appreciate the fine coverage you gave the Indianapolis story, and will always be pleased to help you in any way that we can. Good luck.

Thomas J. Kelley
Public Relations Manager
International Harvester Co.
Chicago, Ill.

Abrasive Wheels

Please forward us, as soon as possible, twelve copies of your booklet, "How and Why of Abrasive Wheels" by James Price and Joseph Biglin. These copies are needed for reference purposes.

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Union Carbide Nuclear Co.
Oak Ridge, Tenn.

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NOW YOU CAN GRIND AND FINISH

NEW BAYFLEX DOUBLE-DUTY

Illustrations above show Bayflex Double-Duty in action, held at correct angle for weld bead grinding (top) and for finishing (bottom)

H WITHOUT CHANGING WHEELS!

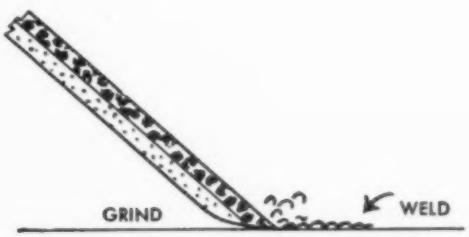
There are two important angles to consider before you buy new weld-grinding or finishing wheels. Bay State's new Bayflex Double-Duty raised hub disc-wheel has them *both!*

The "DD's" unique, two-layer construction gives you two grinding angles: One is 30° - 45° which gives you fast stock removal for grinding weld beads . . . and the other is 10° - 20° which gives you a finish without gouging, a finish so smooth it's just short of a polished surface.

The upper layer for weld grinding comes in a single, standard specification. The lower finishing or blending layer comes in your choice of five different grits (24, 36, 54, 80 and 120) for every type of finishing job from heavy steels through light stainless sheets to aluminum and copper.

Your Bay State representative is ready now to demonstrate the Bayflex Double-Duty in your plant under normal working conditions. Get in touch with him and see what he can do to cut costs and speed up your weld grinding. You'll find he's more than a good salesman . . . because he's an experienced abrasive specialist, too. *Better grinding at lower cost . . . that is his business.*

IS 2 WHEELS IN 1



Upper layer removes stock rapidly when disc is held at 30° - 45° angle.

Lower layer smooths and blends surface when held at 10° - 20° angle.

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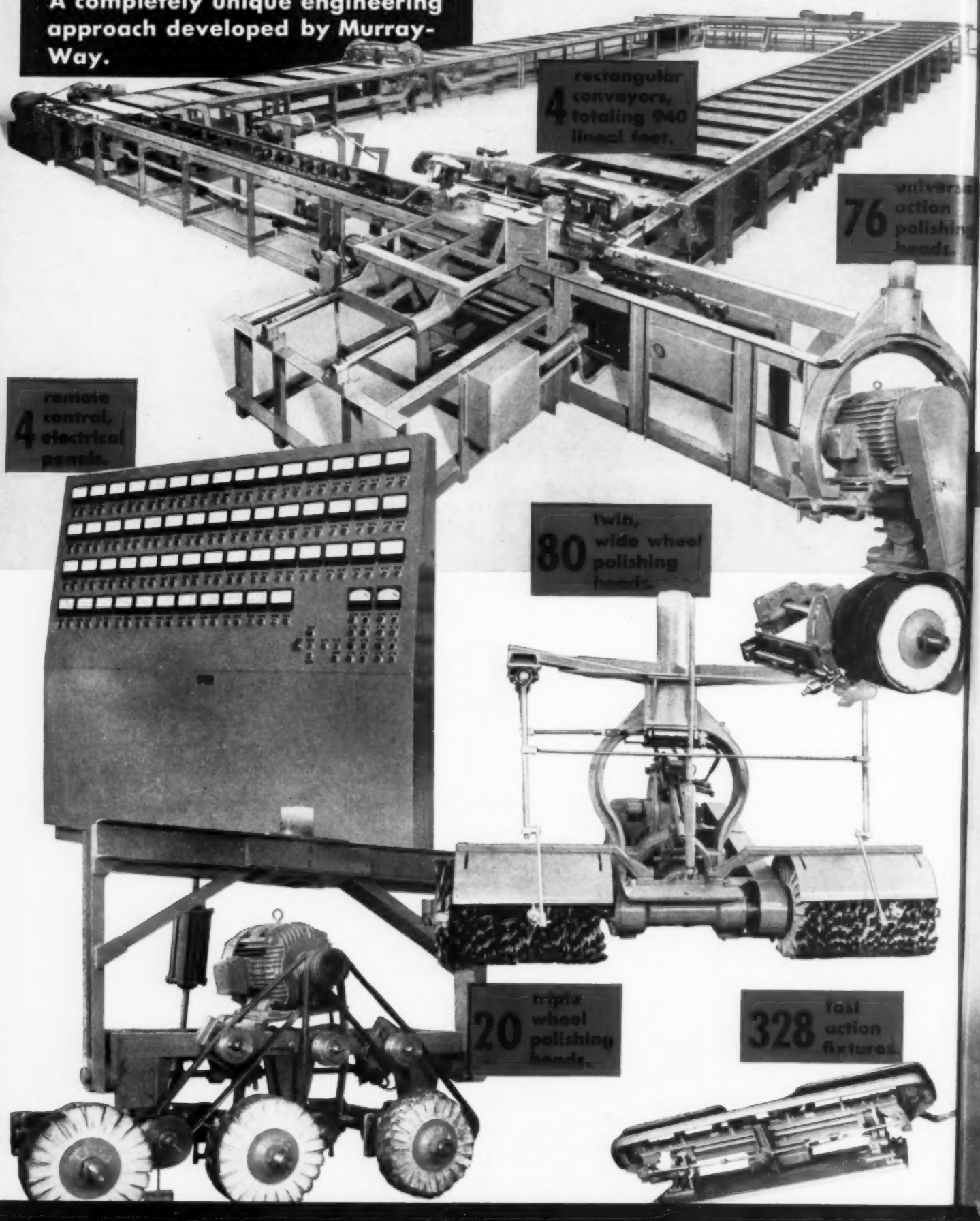
A completely unique engineering approach developed by Murray-Way.


4 rectangular conveyors, totaling 940 lineal feet.
76 universal action polishing heads.
4 remote control, electrical panels.
80 twin, wide wheel polishing heads.
20 triple wheel polishing heads.
328 fast action fixtures.

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- COMPLETELY AUTOMATIC
- DESIGNED TO FIT AN AREA
- MEETING A SPECIAL REQUIREMENT
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- CHARACTERISTICALLY SUCCESSFUL

Murray-Way's engineering talent and production facilities are the finest available. Whether you require a simple installation of our standard units for low budget production or a complete, specially engineered, fully automatic production line, Murray-Way can give you exactly what you need.
Fresh ideas based on broad experiences are what make Murray-Way installations outstanding. If there is a BETTER WAY to accomplish your job you'll find it at Murray-Way.

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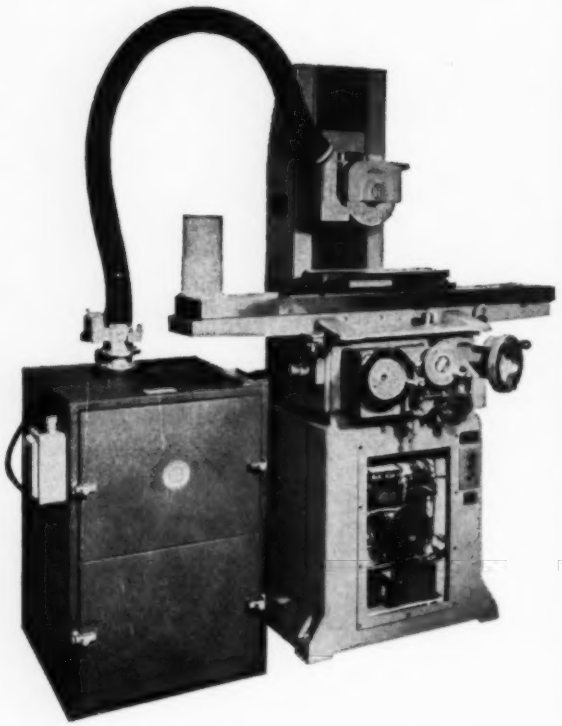
BOX 180 MAPLE ROAD E., BIRMINGHAM, MICH.

1 standard control board.
INSTALLATION "B"
A Murray-Way solution to a low budget problem.
18 simple fixtures.
1 nine foot over and under conveyor.
4 standard, single wheel heads.



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with dust collector

REID-O-MATIC 824 . . .
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Industry's number one choice . . . for toolroom and production economy!

The vast number of REID *precision* surface grinders, in all kinds of industry, is the best proof of their outstanding quality.

In the 618 class these different models are available; a 618 P with power operated table and cross feed — a 618 PT with power table and hand operated cross feed — and a completely manual grinder, the 618 H. Automatic lubrication and a Cross Slide Lock are included on REID grinders as standard equipment.

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For your production and toolroom grinding, REID surface grinders offer the maximum in convenience, quality and economy.

Accessories can be furnished for wet grinding, cool grinding, dust collecting and other needs.

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Editor's Page

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Remember 1956 ?

The low point of the recession has passed! If you or your company haven't felt the upward trend you soon will. This considered opinion of almost all the economic experts is encouraging news but are you ready for it? Think back to 1956 or 1957. Do you remember the few times you were able to review in your mind the overall picture and say, "If I just had the time we could replace that turning operation and grind." Or maybe you said, "We sure could save time and money if we didn't have to carry that part so far."

During good times we can see the need for improving our operations but business is so pressing that there is no time to completely reorganize and incorporate the improvements. During the bad times there is seldom money enough to reorganize nor is there the need. When is the time to improve your operations? It's right now!

At this time most companies are not producing at a peak but the future looks good. This means the investment in tools for reorganization should be made now. Still another advantage is that the shop is not overloaded with orders that must go out on time. Right now delivery schedules are not too difficult to meet but what about six months from now? Now is the time to organize your operations so that schedules can be met six months from now.

There is another equally important reason for changing your methods and types of operations now. The machine tool builders and supply manufacturers are in the same position you are. They are now more able to supply you with the equipment and supplies you need than they will be in six months or a year. There just might be a better price now than in six months or a year. The same experts referred to in the first paragraph also say that the 60's will be boom years and therefore will carry increased prices into effect.

You might be thinking that the comments above make sense but there just isn't any time even now. It may be that your plant is back to two shifts or more. It is impossible to pick a time that is good for all concerned. What can be said without fear of contradiction is that procrastination has never led to success. Only through action right now can any of us expect to move ahead.

M. M. Patterson

Managing Editor

Why G-E man-made industrial diamonds are revolutionizing carbide grinding

Metallurgical Products Department reports on users' experience. Results: 35% higher average efficiency . . . at least 20% lower power consumption . . . than is possible with natural diamonds.

Now it has been proved . . . grinding wheels containing General Electric man-made diamonds *actually out-perform natural diamonds!*

In actual production, G-E man-made diamonds have maintained sharper cutting edges, have cut more freely. They top natural bort because rigid manufacturing control maintains uniform quality. G-E man-made diamonds are more blocky and rough surfaced . . . provide extra support in the bond. They are also more friable, so that sharp, new cutting edges are constantly presented in the grinding operation.

Wheels made with General Electric man-made diamonds are available *in quantity* now. They'll deliver a production bonus averaging 35%. Be sure *you* cash in on this superior performance by specifying wheels containing G-E man-made diamonds from your regular wheel supplier. *Metallurgical Products Department of General Electric Company, 11177 E. 8 Mile Street, Detroit 32, Michigan.*

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Grinding Disc: The Cortland Tufcor® Disc is aptly named. A rigid disc with depressed center, reinforced throughout with Fiberglas and Resinoid® bonded, it tackles such jobs as undercutting and removing weld beads, roughing off fins and scabs, notching, cutting off gates and risers, and smoothing flame-cut burrs and sharp edges.

Greater Safety: Tufcor performs all these (and more) operations with a high degree of safety, too, thanks to the use of Fiberglas plies and special high-strength bonding developed by Cortland research.

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Chester, Massachusetts

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In Ultrasonic Impact Grinding, machines convert electric current into mechanical vibrations at the rate of 25,000 cycles per second, and drive abrasive against the work with an impact force of 150,000 times the abrasive's own weight. The two leading manufacturers of machines for this process recommend NORBIDE abrasive grain as best for nearly all applications. Workpieces shown are of such alloys as Stellite, Rexalloy, and Alnico. In grinding, slicing, dicing, drilling these and many other hard or brittle materials NORBIDE grain is unequalled for high precision and long service life. (Photo courtesy Raytheon Mfg. Co.)

The hardest metal parts are easiest to finish

...when you use NORBIDE* abrasive

Extra hardness, one of the most useful qualities of the new metal alloys, is also one of the most powerful challenges to adequate finishing.

NORBIDE boron carbide grain meets that challenge with its own extra hardness. Of all commercial abrasives, this Norton development is second only to diamonds in hardness. And although diamond dust costs several hundred times as much, NORBIDE grain is comparable in cutting action. That's why it is an outstanding cost-saver in many metalworking jobs.

See your Norton Distributor for details on how NORBIDE abrasive can improve quality and cut costs in your production. Or write to NORTON COMPANY, 47 New Bond Street, Worcester 6, Mass.

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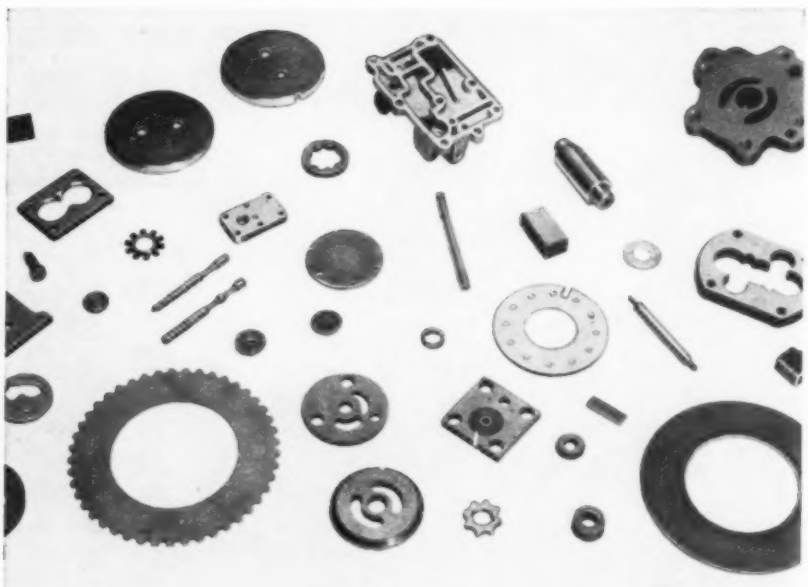
NORTON
BORON CARBIDE



In Lapping, NORBIDE grain is the ideal cutting agent in many compounds. To lap carbide inserts, for example, this abrasive in a liquid vehicle gives excellent results without heat, vibration or thermal shock. And unlike conventional abrasives, the resistance of NORBIDE grain to fracturing and splintering keeps finished surfaces free from tiniest scratches on all work, including the new alloy parts shown.

G-357

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Metalworking in General

Quality Vs. Mediocrity

One of the largest deterrents to our American economy and our successful fight against communism is our current acceptance of the mediocre is the opinion of Daniel A. Friedman, President of Solar Steel Corp., Cleveland, in a speech before the Chicago Kiwanis, February 17.

Friedman pointed out that statistics indicate we are heading for a boom era—by 1965 the United States will have a poulation of 190 million, a personal income of over 450 million, and a gross national product of 590 million. Large and small companies should plan for the increased demands of industrial and consumer products. There should be a mental and emotional preparation of a company's managers and its personnel to produce the best goods or services.

Our race with Russia is a race of quality because in this era of science and technology, a large number of average achievements may not outweigh a few superior ones. To win the race we must encourage better than average individual performance by everyone.

Re-Training Employees for Automation

One of the most important considerations in business today is the scientific and continued re-training of employees for new jobs under conditions of increasing automation, Ben P. Sax, Chairman of the Board of the American Buff Co., Chicago, told representatives of foreign manufacturing groups who have been holding a series of meetings in this country.

"Whereas the major reason for automating a manufacturing procedure is to cut production costs and step up the number of units produced to increase profits, a short-sighted policy on the part of management exists where careful consideration is not given to retraining for other jobs employees whose past work has become obsolete by automated manufacturing or office methods," Sax said. "In many cases, by business and engineering analyses, management can forecast areas where these employees with proper training can be more valuable to the company than new people hired at a later date, when the need may arise."

New Metals Shown at British Exhibit, April 16-30

Exhibits which interest Americans at the 1959 Engineering, Marine, Welding and Nuclear Energy Exhibition scheduled for London, April 16-30, concern recent developments in the production and fabrication of new engineering materials. In this class are titanium, niobium, zirconium, tantalum, molybdenum and beryllium.

Titanium, relatively new to engineering, is the fourth most abundant metal. Resisting corrosion, it is widely used in aircraft construction, for gas turbine compressor blades, on the leading edges of wings and in muzzle blast tubes, which are subject to considerable erosion.

Zirconium is also fairly common, being more plentiful than nickel and copper. Tantalum is normally worked cold, using high speed steel tools. The value of niobium is that it is soft and ductile. The best known of the new metals, molybdenum, has been found to have excellent high temperature properties.

Regenerator Permits Use of Gas Turbine Engine in Autos

A rotary regenerator, which permits economical use of gas turbine engines in automobiles, was described at the Gas Turbine Power Conference of The American Society of Mechanical Engineers by Paul T. Vickers, Engineering Supervisor for the General Motors Technical Center, Warren, Mich. He said that a regenerator added to the turbine cuts the amount of fuel that the engine requires for operation. Since gas turbines are hardy engines that can burn just about anything for energy and have fewer parts than the standard piston engine, their use could be a boon to motorists. There are a few wrinkles which need ironing out, but new testing methods on the regenerator are leading to improved results.

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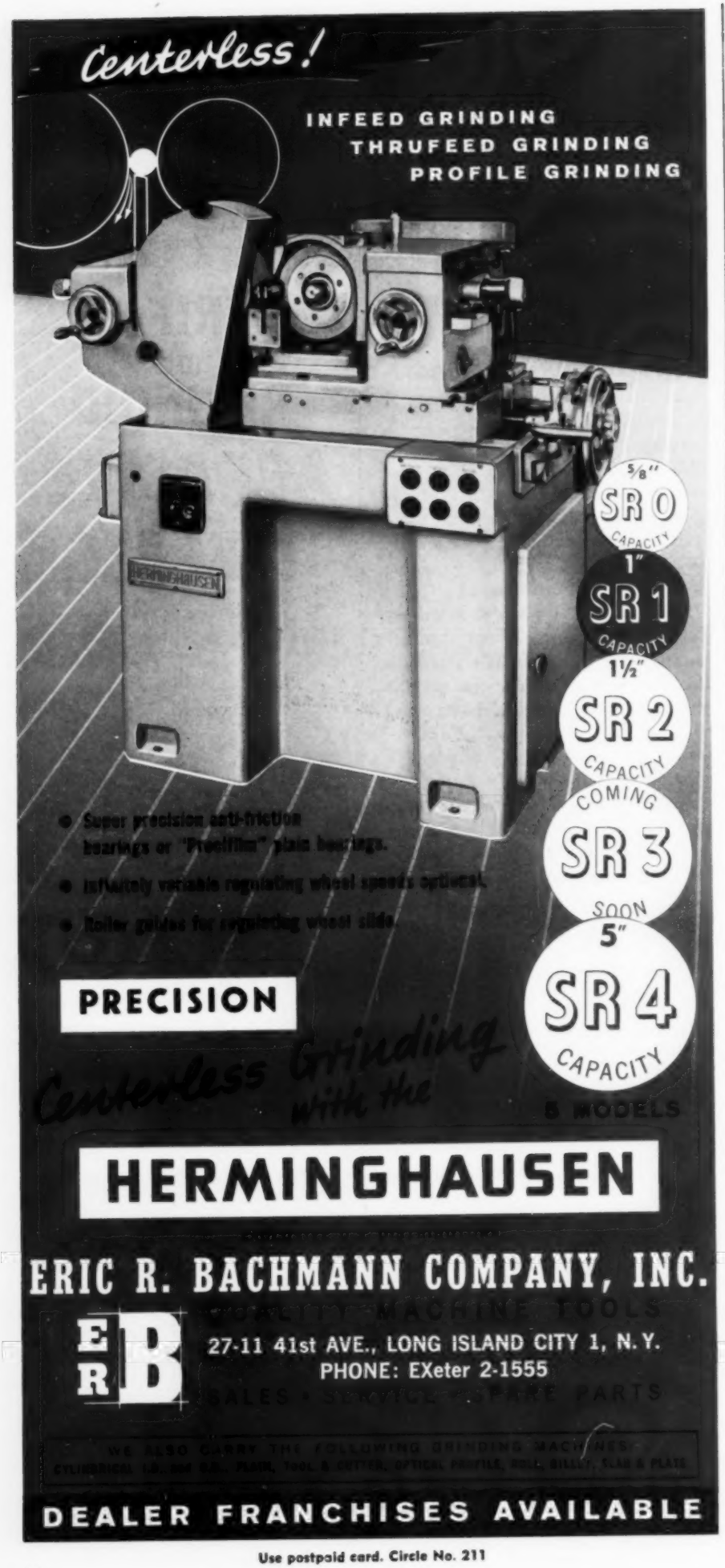

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Metalworking in General . . .

work heat that would otherwise be wasted in exhaust gas. Air from the outside is warmed when it comes into contact with the regenerator. No new fuel has to be burned for this job.

Problem of Radiation Damage to Materials and Engines

Nuclear-powered aircraft with virtually unlimited flight range can be a reality soon, but imaginative planning, not "yesterday's design philosophy," is needed, stated D. R. Riley of the Aircraft Nuclear Propulsion Dept. of the General Electric Co., Cincinnati. He spoke at the Gas Turbine Power Conference sponsored by The American Society of Mechanical Engineers.

Designers of nuclear aircraft engines will have to consider new problems such as finding materials that will not be damaged by radiation and engine designs that permit remote control servicing to guard mechanics from radiation injury, Riley said.

Terminal Conference on the U.S. Trade Mission to India

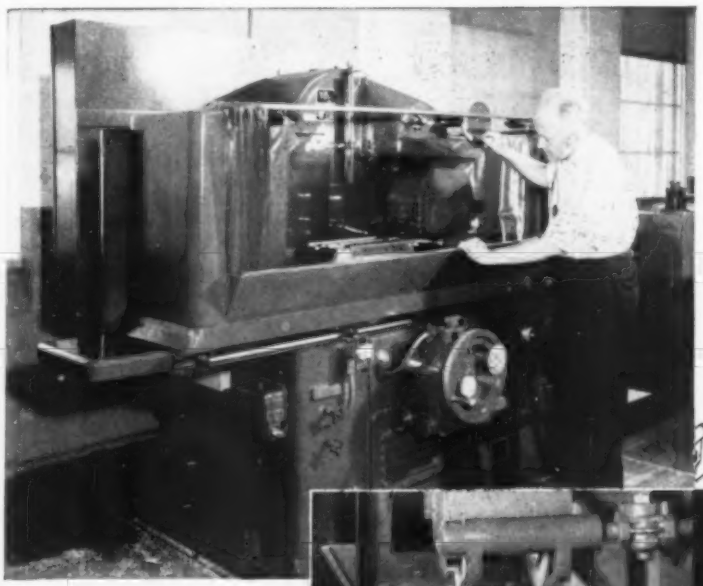
The Terminal Conference on the U.S. Trade Mission to Delhi and Northern India took place in Chicago, March 5. The mission is an international trade promotional activity of the Department of Commerce.

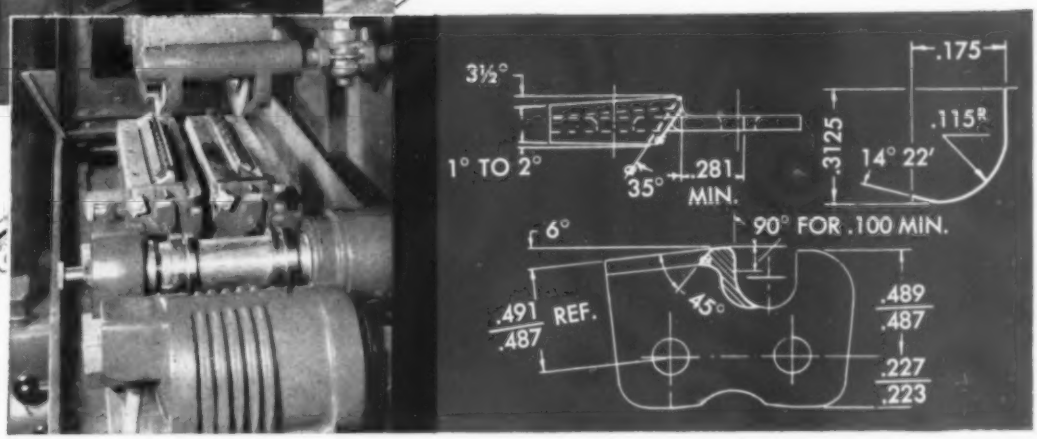
"Problems of Developing Small Industries as Suppliers of Parts and Components . . . ." was the message of **Herbert F. Harig,** President of Harig Manufacturing Corp. of Niles, Mich.

Team leader of the mission was **Nathaniel Knowles,** Deputy Director of the Bureau of Foreign Commerce, U.S. Department of Commerce. Other members included **Wallace E. Carroll,** Pres. and Treas. of American Gage & Machine Co., Chicago; **Frederic W. Deisroth,** Pres., Peter Deisroth Sons, Hazelton, Pa.; **George J. Kuehnle, Jr.,** Vice-Pres., Cincinnati Gas & Electric Co., and **William F. Hauck,** former Vice-Pres. of Bank of America and currently financial consultant to a number of U.S. firms.

3,000 members of Indian business were reached and more than 60 manufacturing plants visited during the team's two-month stay. It was estimated that 800 of the consultations can be classified as having good-to-excellent trade, licensing, and private investment possibilities. Capital, machinery, technical assistance, and patent licensing agreements are the major categories of interest for collaboration between Indian and American businessmen.

Thompson — TRUFORMING CUTS COSTS 60%





For 140 years, the policy of The Draper Corporation of Hopedale, Mass., has been to offer the highest quality product at the least possible cost.

Following this policy, its subsidiary, BlueJet Corporation, manufacturers of the famous BlueJet saw chain, installed a Thompson Truforming grinder to grind the cutting edges on their chain saw routers. These routers were formerly ground, piece by piece, by a force of 8 employees.

The Thompson Truforming operation is now cutting former grinding costs by 60%. 3 men only are now required for the operation. 40 L.H. and 40 R.H. routers are now ground simultaneously with one pass of the crush formed wheel, resulting in a day's production of over 12,000 pieces—many times that produced by the former method. Both the uniformity and sharpness of the routers have been greatly improved.

For 25 years, Thompson has pioneered and developed the modern advances in crush form grinding. If you have a time-saving, product-improving or cost-cutting problem in your operations, it will pay you to investigate the work Thompson Truforming grinders are now doing in plants all over the country. Our engineering experience is available to you without obligation. Write for Catalog T558.

"Keep Thompson in mind for the daily grind"

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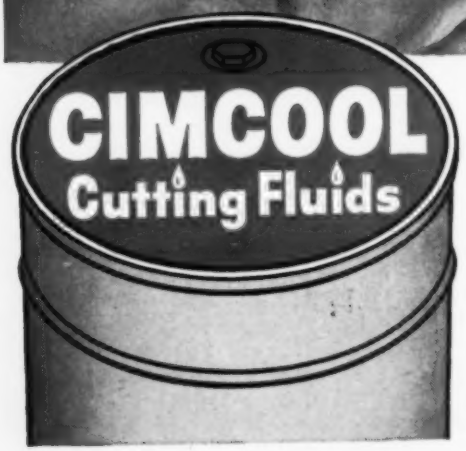
"Latest Cimcool Success Story!
Nation's best-selling chemical
cutting fluid scores again!"
SALES REPORT
2.
and this company* had been
using a good grade soluble oil
at 1:20 for machining steel.
But rancidity was making them
change the coolant every week.
So they put in Cimcool at a
1:40 dilution. That was three weeks ago.
And still not a sign of rancidity!
CIMCOOL has saved them money,
and kept production going.
Their grinding room foreman also wants
Cimcool because it has already
increased cutting fluid life three times!
Bud Hume
Detroit Office
* Name of this construction machinery manufacturer on request



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Grinding Safely

RICHARD L. McKEE • Associate Editor

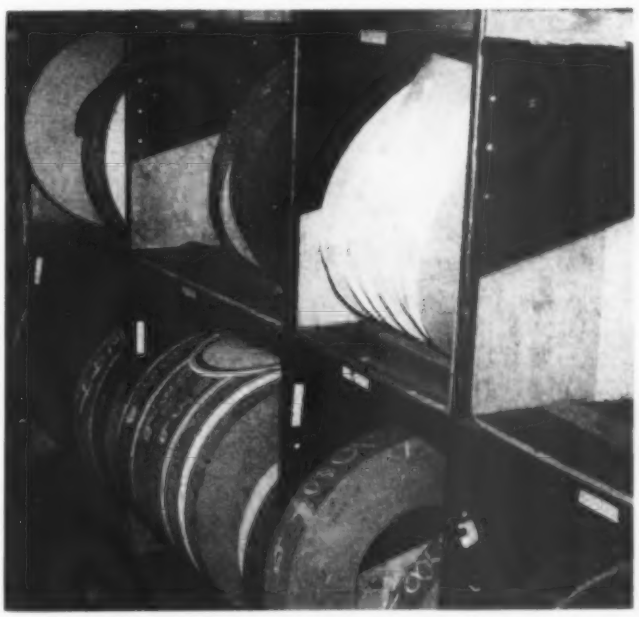
STACKED... Safely

● The proper storage of grinding wheels before they are used and between periods of use is an extremely important factor in their safe use. While the construction and location of storage facilities is more a matter of plant management than of individual performance, it pays to check up once in a while to make sure that current practices agree with safety recommendations.

For instance, all storage areas should be dry, not subject to extreme temperature changes, particularly below freezing, conveniently located to the using departments, but away from excessive vibration.

Central storage under someone who knows abrasives is advantageous, not only from the standpoint of safety, but also to minimize grinding wheel inventory.

The size and design of racks are determined solely by the number, sizes and shape types of the wheels used, following these general principles:



A central storage area. Note the small wheels stacked on the top shelves. Beveled wooden retainer strips, to hold wheels on the shelves, and cardboard separators for wheels standing on edge show up most plainly on the middle shelf. The dark area on the floor (lower left) is a strip of rubber matting on which wheels can be safely rolled, hoop-fashion, in case this becomes necessary.

A "peg-board" type storage area in a tool room. While this differs from the recommendations above, it is permissible for a small inventory of wheels as long as there is no vibration which would damage them. Normally, each peg would hold only one type and specification of wheel, identified by the card in the holder above the peg. (Photos courtesy International Harvester Company)

In general, all straight wheels 6" in diameter and larger should be placed on edge in racks in such a way that they cannot tip or fall over.

Smaller straight wheels, flaring cup wheels and dish wheels are best stacked flat with some kind of cushioning material such as corrugated cardboard between them.

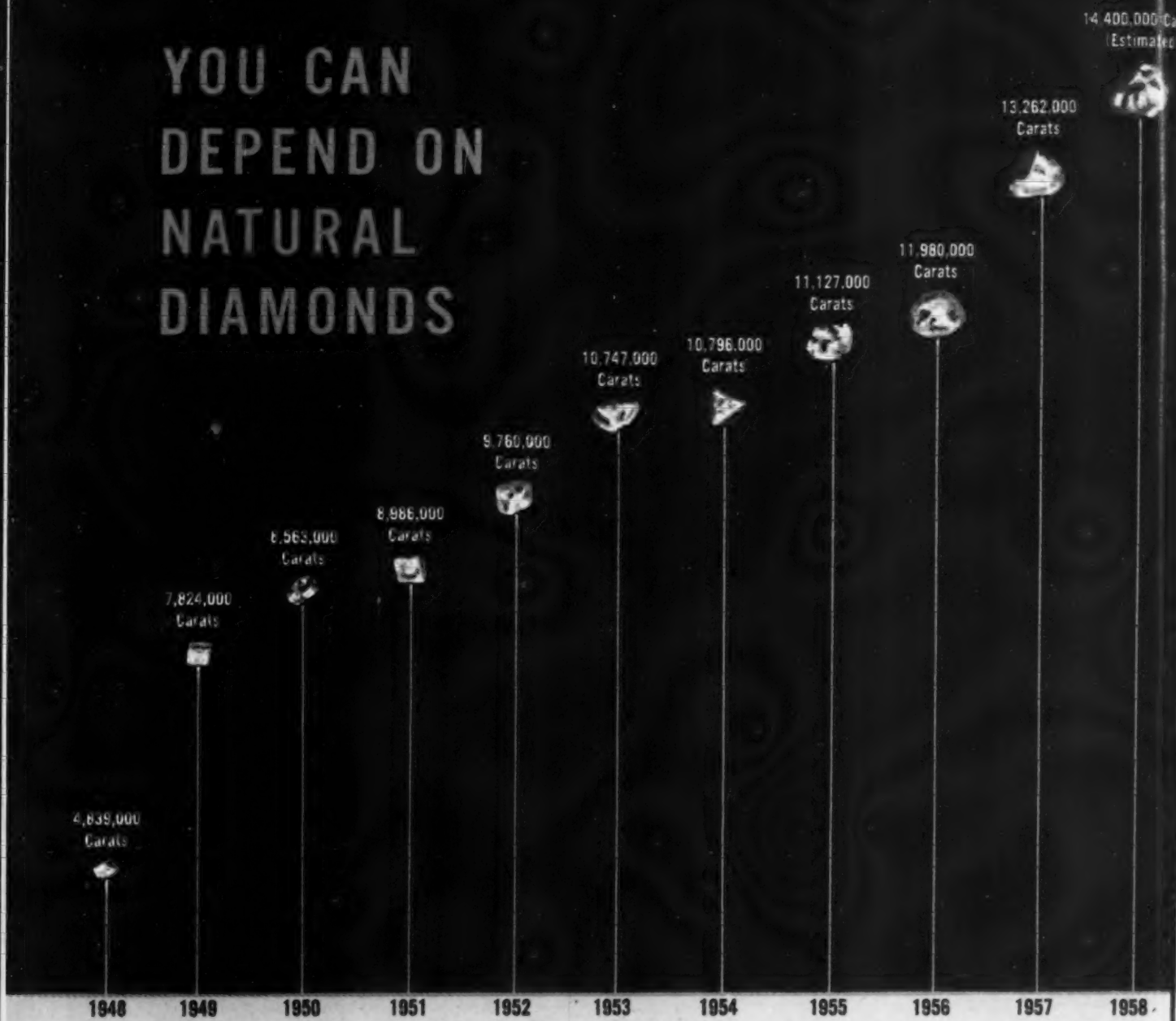
Straight cup wheels and wheels with tapered sides may be stored either flat or on edge. When tapered wheels are stored flat, only a few should be included in each stack.

All Type 1 thin wheels, regardless of bond, should be stored flat, on a perfectly flat surface, to prevent warpage. In this case, not even blotters should be placed between the wheels.

Small wheels which cannot be conveniently stacked are best stored in bins or drawers.

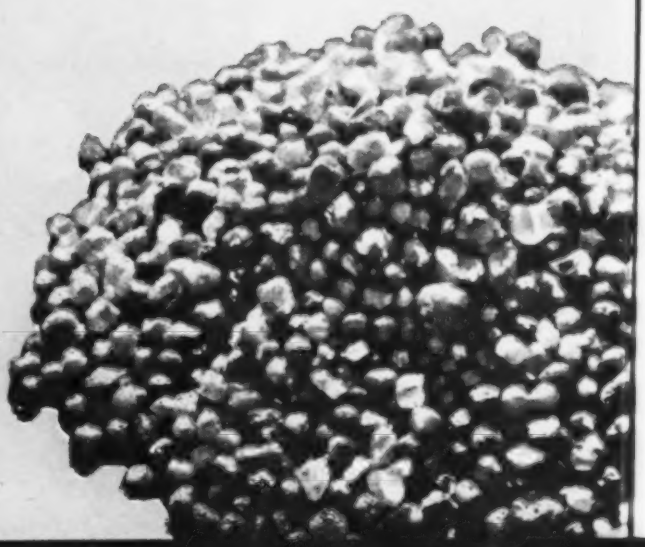
Finally, storage should be designed so that individual wheels of any specification can be selected with as little handling of other wheels as possible. • • •

YOU CAN DEPEND ON NATURAL DIAMONDS



Boart production rises 197% in 10 years

Since 1948 production of crushing boart has risen 197 per cent. This means that there are ample supplies of natural diamond mesh for all the needs of American industry.



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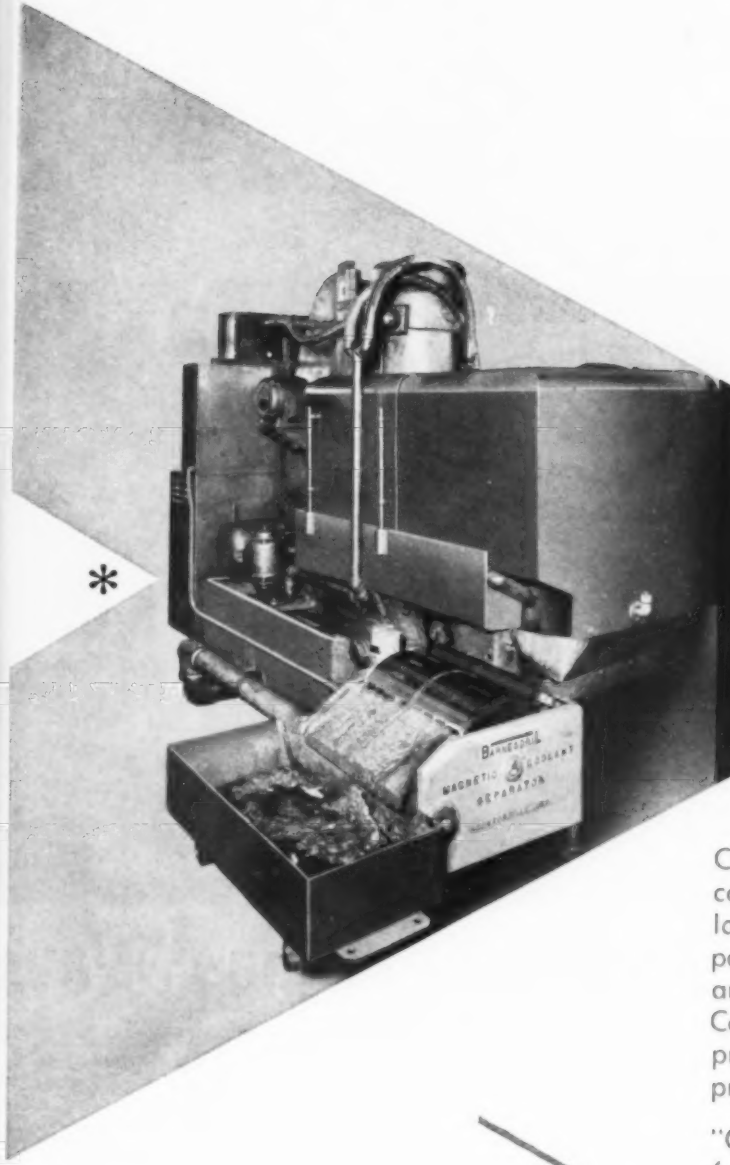

*

CUT maintenance, labor costs

INCREASE PRODUCTION!

Coolant fed into a BarnesdriL magnetic coolant separator continuously circulates around the drum of powerful permanent Alnico magnets. Swarf, chips, and other ferrous particles are removed. Coolant is cleaned by the separator, thus preventing machine downtime and improving finishes.

a user reports:

"Our surface grinder (above) required 6 hours of cleaning and 5 gallons of coolant per week. With the BarnesdriL magnetic separator installed, there has been no downtime in 4 months and coolant used has dropped to 1 gallon per week. We cut our grinding costs $65.50 per week. Paid for the installation in less than 2 months."

These savings are typical. Call your BarnesdriL Factory Representative today or write for Catalog 300.

*BarnesdriL Magnetic Separator #4 installed on a Blanchard No. 18 Surface Grinder.

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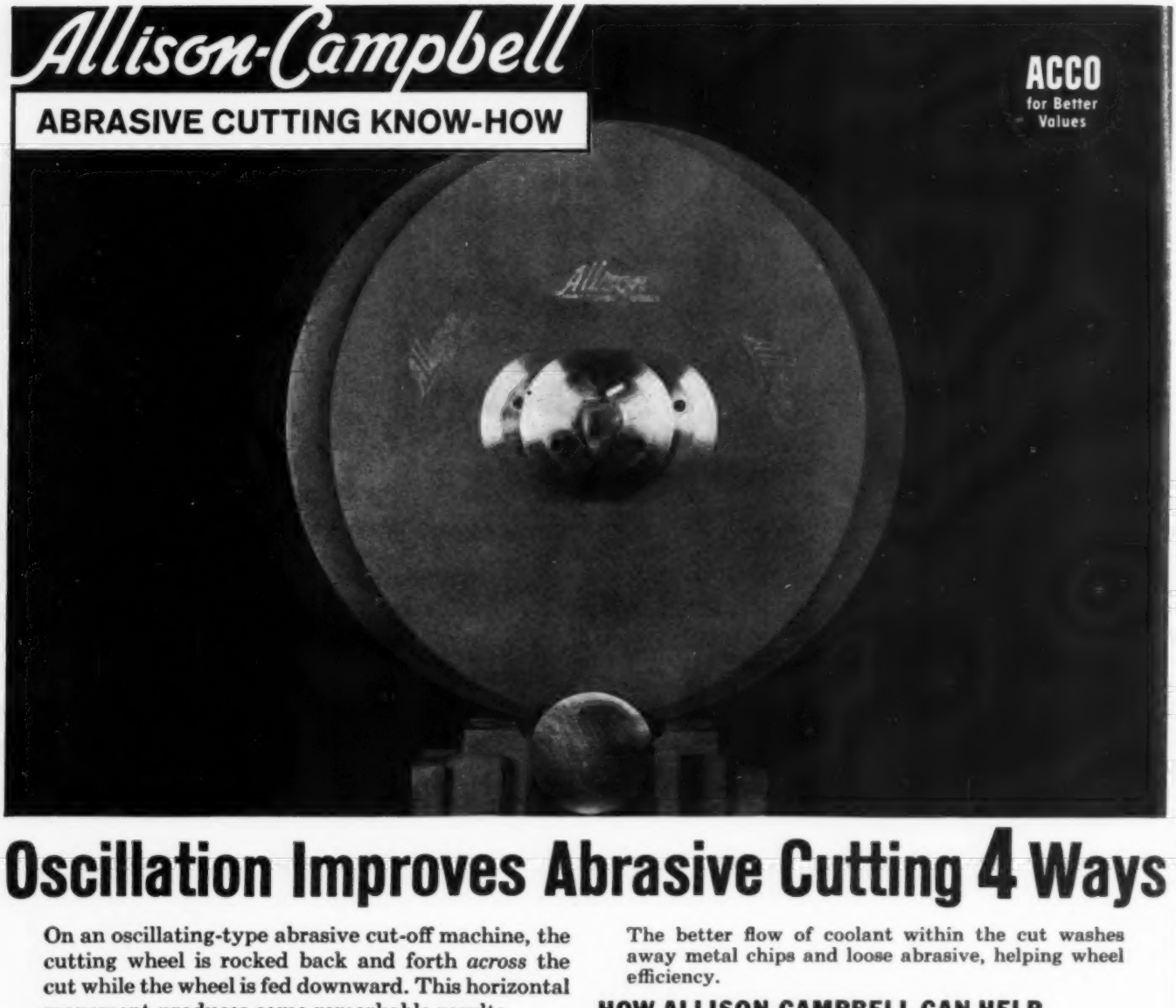
ABRASIVE CUTTING KNOW-HOW

ACCO for Better Values



Oscillation Improves Abrasive Cutting 4 Ways

On an oscillating-type abrasive cut-off machine, the cutting wheel is rocked back and forth *across* the cut while the wheel is fed downward. This horizontal movement produces some remarkable results.

1 **Greater cutting capacity** is one big advantage of oscillation. Because oscillation reduces the arc of contact between the wheel and the work, it is possible to cut solid steel bars up to 12″ square. Without oscillation, 2″ to 3″ would be the practicable limit.

2 **Faster cutting** is another benefit of oscillation. Because the reduced arc of contact offers less resistance to the cutting wheel on large sections, the same wheel cuts faster, straighter, and with less feed pressure. Cutting rates of 4 to 8 seconds per square inch are maintained on even the largest cross-sections.

3 **Better quality cuts** are obtained with oscillation. Less heat is generated because of the small arc of contact, and the rocking action permits coolant to enter the cut more easily and prevent any heat build-up.

Burn-free cuts are produced with negligible burr, and there is little or no need for further finishing.

4 **Longer wheel life** is an important economy factor. The lower cutting temperature resulting from oscillation adds extra cuts to the life of every wheel.

The better flow of coolant within the cut washes away metal chips and loose abrasive, helping wheel efficiency.

HOW ALLISON-CAMPBELL CAN HELP

A complete selection of machines and wheels for *any* cut-off application is offered by ALLISON-CAMPBELL. Four types of CAMPBELL machines—chop stroke, oscillating, horizontal, and rotary—in capacities from the smallest stock to 14″ rounds . . . billets up to 12″ square . . . plate up to 6″ thick and 20 ft. long. ALLISON wheels—more than 150 different specifications—rubber or resinoid bond—3″ to 34″ diameters—.006″ to 3/16″ thick.

Expert recommendations from your ALLISON-CAMPBELL Field Engineer can solve your cut-off problems for you. He'll be glad to show you how to get the faster, cleaner cuts you can expect from modern abrasive cutting techniques. Ask him.

WRITE FOR NEW BULLETIN

• Individual analysis of your cutting problems can be made in the new ALLISON-CAMPBELL Demonstration Laboratory. Write for a copy of DH-20, a new bulletin which describes how you can use these facilities. Complete details on ALLISON wheels and CAMPBELL machines are also available.

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You Asked . . .

ARTHUR RAKESTRAW

Tightening Grinding Wheel Flanges

● In the Safety Code, the recommendation is to tighten the spindle nut "only enough to hold the wheel firmly." Is there a more specific way of saying this? How much difference does the thickness or size of the wheel make?—R. D. London, Ont.

The Safety Code must of necessity cover the subject in such a manner as to take into consideration all abrasive wheels, regardless of usage, which are held on the arbor by a spindle nut.

The spindle nut should be tightened with sufficient firmness so that the friction of the wheel flanges will provide rotation of the abrasive wheel without slipping. The spindles are designed with right or left thread so that the directional rotation has a tendency to tighten with any torque force on the wheel.

The abrasive wheel diameter and thickness does make a difference in the amount of spindle nut pressure. However, if the wheels are properly applied for the given operation, they are structurally built to withstand the resultant flange pressure. For instance, considerably more spindle nut pressure would be necessary to drive a 30" x 2" x 2" snagging wheel powered by a 10 hp motor than would be necessary to hold an 8" x ½" x ½" tool grinding wheel driven by a ½ hp motor.

Unfortunately there are some grinding operators who erroneously believe that heavy spindle nut pressures provide added protection in restraining broken wheel sections should the abrasive wheel break in operation. Excessive spindle nut pressures may be the cause of wheel breakage, due to distorted wheel flanges and the resulting uneven flange pressure.

Usually the abrasive wheel, if properly applied, has sufficient built-in structural strength and does not require flange pressures in excess of that needed to provide rotation and prevent slippage on the arbor.

Grinding or Milling Die Blocks

● Would it be more economical to grind or to mill the six surfaces of a die block of 4140 steel hardened to 60 Rockwell "C"? The block is 2" x 3" x 24" and must be finished to 16 RMS, plus or minus .001", with 3/16" of stock to be removed.—D. O. Erie, Pa.

Our conclusion as to the most economical method of handling these die blocks would be influenced considerably by the number of blocks to be processed. It has been our experience in working with grinding shops which specialize in finished steel die blocks that milling is seldom if ever done. Most shops are equipped with large vertical spindle surface grinders of the Blanchard or Hanchett type, with capacity for grinding die blocks of almost any size.

Even with carbide milling cutters it would be difficult to remove 3/16" stock from blocks of 60 Rockwell "C" hardness. In order to obtain the required 16 RMS finish, you undoubtedly would find it necessary to finish grind the die blocks, even if it were possible to mill them previously.

Grinding in all probability is the more economical method, otherwise these established shops would not be using this method.

Honing or Internal Grinding Drive Flange

● Attached hereto is our print showing our part WMAE-1, a drive flange. This part is made from No. 8620 steel, heat treated to 58-60 Rockwell C, .030" case. The internal grind will be made on the 2.625" dimension and we should hold to plus or minus .0005" on roundness of the hole. Is this best done by honing or grinding? If we hone we will probably have to remove no more than .002" or whatever may be necessary to take up the warpage in heat treating. If we grind, we may have to take up this warpage, plus possibly another .002" or .003" to take care of lack of concentricity in chucking.—J. V. Colorado Springs.

Your question as to the choice between honing and internal grinding of a drive flange has been the subject of considerable discussion in the staff here. However, boiling the question down to a straightforward choice between the two methods and omitting consideration of matters such as availability of equipment, volume of production and similar variables, the opinion might be summed up as follows:

The dimensions of the piece, which are quite similar to those of an automotive connecting rod, and the fact that the tolerances on the o.d. are looser than those on the i.d., tend to tip the balance toward honing. A number of companies, have had considerable experience in floating such pieces in a fixture and using a honing tool of the rigid type. This allows the honing operation to follow the axis of

You Asked . . .

the previous operation, while the floating fixture greatly reduces set-up time.

On the other hand, the piece can be internally ground to advantage if the tolerances on the o.d. can be reduced to a point at which the part can be chucked with sufficient accuracy. This may require some increases in the stock allowance on the i.d. The part can be chucked without distortion.

Some doubt has been expressed as to whether warpage in heat treating can be held within .002" as you indicate. If this can be done, then honing is probably the answer. If not, then the stock allowance on the i.d. should be increased to approximately .006" and the part should be internally ground.

The relative amounts of time required for the two methods would depend to a considerable degree on the specifications of the wheel or stones involved, as well as on the workpiece set-up and the amount of stock to be removed. It would be difficult to say that one operation is basically faster than the other, without taking these related factors into account.

Elliptical Grinding Without Special Head

● **In the January issue a reader complained about a center type grinder grinding elliptical. Is it possible to grind elliptical and control this shape on live head grinding without using a special head or cam follower?—C. M. Huntley, Ill.**

It would be possible to produce elliptical shapes, with a minute rise as measured from the work piece center, though the shape could not be controlled nor duplicated.

With misaligned grinder centers, the general contour of the work piece would be elliptically out of round, with the out-of-roundness appearing on opposite sides of the piece, at the ends. The greatest amount of out-of-roundness would occur with short pieces, which would also produce the greatest amount of taper in the piece length. The longer the work piece, the less noticeable would be the over-all effect.

We believe it would be impractical to attempt to determine the machine setup, either by trial or predetermined layout, to produce controlled shapes of an elliptical form, by making use of a machine error. The only practical method to duplicate elliptical shapes on a grinder is by use of some form of cam grinding attachment with a precision ground master cam.

Improving Quality of Cut With Cut-Off Wheels

● **Occasionally we need to cut lengths of ALX alloy tool bits, using a 46 grit resinoid bonded cut-off wheel, and we are dissatisfied with the quality of the cut. This is a dry operation. Would it be better to use a coolant? If so, what kind of wheel should we use?—G. Z. Rome, N.Y.**

From the statement of your problem we assume that the cut surfaces of the tool bits are discolored and blued. This quality of cut is common with dry cut-off.

If you wish to avoid the discolored cut surfaces, we feel that the use of a coolant and a change to a rubber bonded abrasive cut-off wheel will provide the quality of cut that you desire.

Another advancement in perforator grinding...

HARIG Grind-All FIXTURE

Easily grinds irregular shaped perforators concentric with shank within ± .0002 accuracy. Also, can be used for light milling and boring fixture, inspection tool, etc.

1 Single locking screw—fast action v-block adjustment holds it in desired position.

2 Handy crank speeds rotation of index plate.

3 Hardened and ground construction — a life-time of service and precision accuracy.

NEW RADIUS DRESSER ARM

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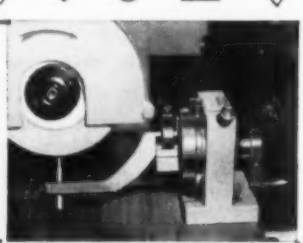
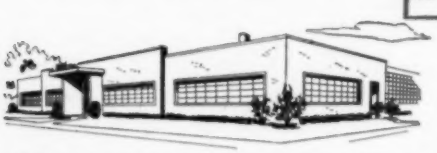


ATTACHMENT QUICKLY CONVERTS HARIG GRIND-ALL FIXTURE INTO A PRECISION RADIUS DRESSER



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Don't wait! Send now for more information about Harig's new Grind-All Fixture.

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Grain for Wheels, Coated Abrasives

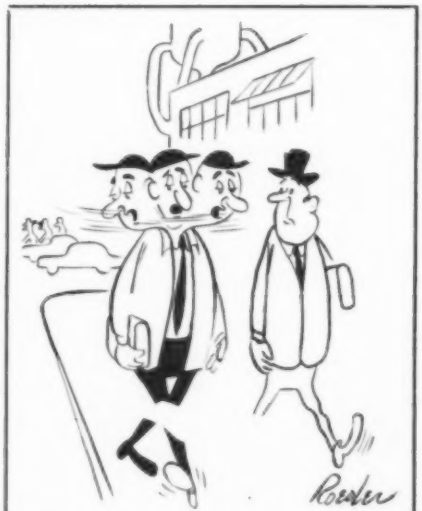
● Is the abrasive grain used in grinding wheels the same as that used in coated abrasives?—R. R. Cleveland

If you have reference to the basic material itself, such as aluminum oxide or silicon carbide, designated by trade names by the various manufacturers, the answer is that these materials are used in both wheels and coated abrasives. However, there are a number of abrasive materials such as garnet, flint and silica sand which are used only in coated abrasives. There are likewise abrasives used in the manufacture of abrasive wheels which are not utilized in the coated abrasive industry.

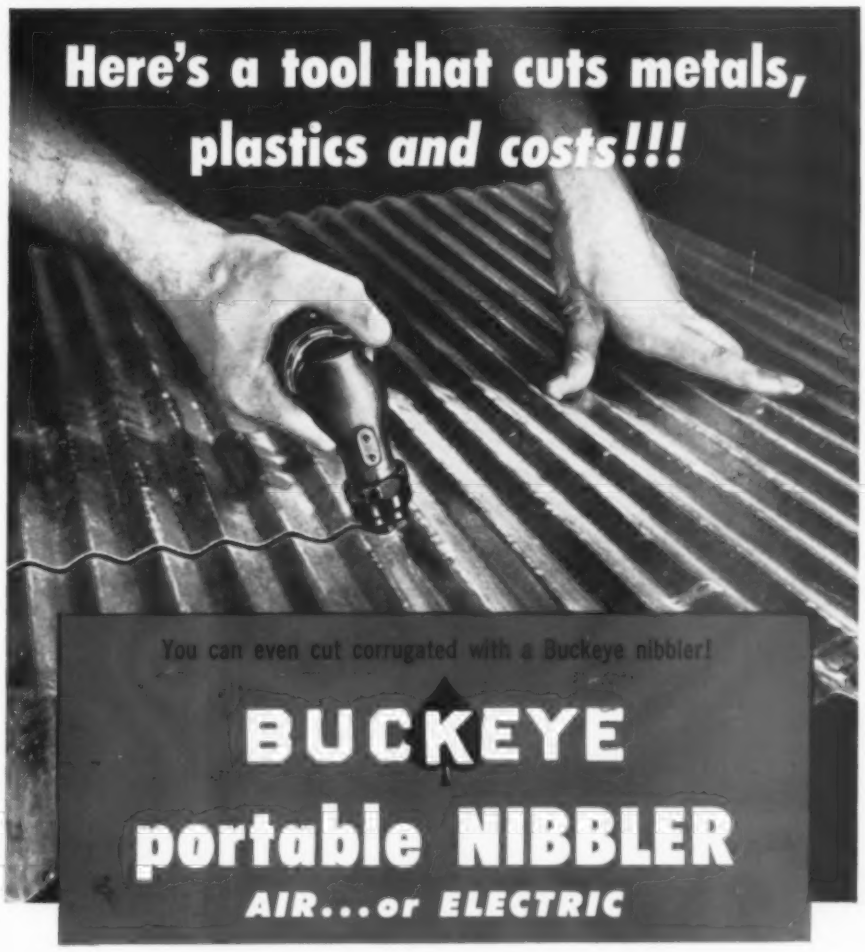
If you have in mind grain shape as well as kind of material, there are some slight differences. Slivery type grain is not objectionable in coated abrasives. In fact, in many applications it is desirable due to the increased cut and increased bonding strength. In wheels this type of elongated grain can only be used in softer grades which do not require heavy pressures to force the material into the wheel mold. •

YOUR QUESTIONS ANSWERED!

Send your questions and problems to GRINDING and FINISHING. Your problems may be similar to many others so let's get them out in the open. Our new question and answer section will attempt to answer the bothersome detail problems as well as the major difficulties. Please include all the facts involved in your question.



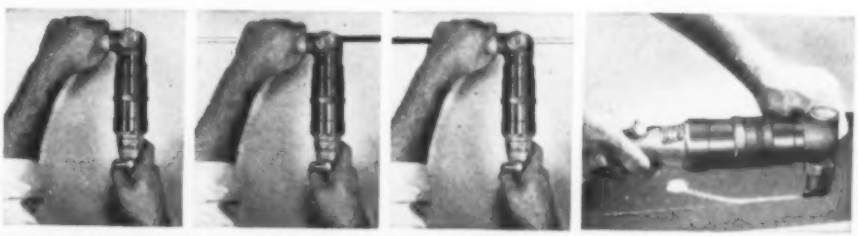
"Back and forth—back and forth! I'm getting fed up watching that surface grinder!"


Here's a tool that cuts metals, plastics and costs!!!
You can even cut corrugated with a Buckeye nibbler!
BUCKEYE
portable NIBBLER
AIR...or ELECTRIC

Eats right through 8 gauge mild steel at a 5-6 foot-per-minute rate. Makes a sharp, clean cut, free of distortion on sides, top and bottom. Works on materials of any size or shape. Starts cutting anywhere on the work, follows any contour, in any direction.

Now — bring the tool to the work, eliminate handling time and costs on large, cumbersome workpieces. Now — use this economical, portable tool for cutting metals and plastics, keep expensive, stationary machinery available for regular work.

Pick your type of power — air or electric — from ten models of the Buckeye nibbler, one designed for your kind of work.



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INDUSTRIAL AIR TOOLS SINCE 1920

Buckeye Tools CORPORATION

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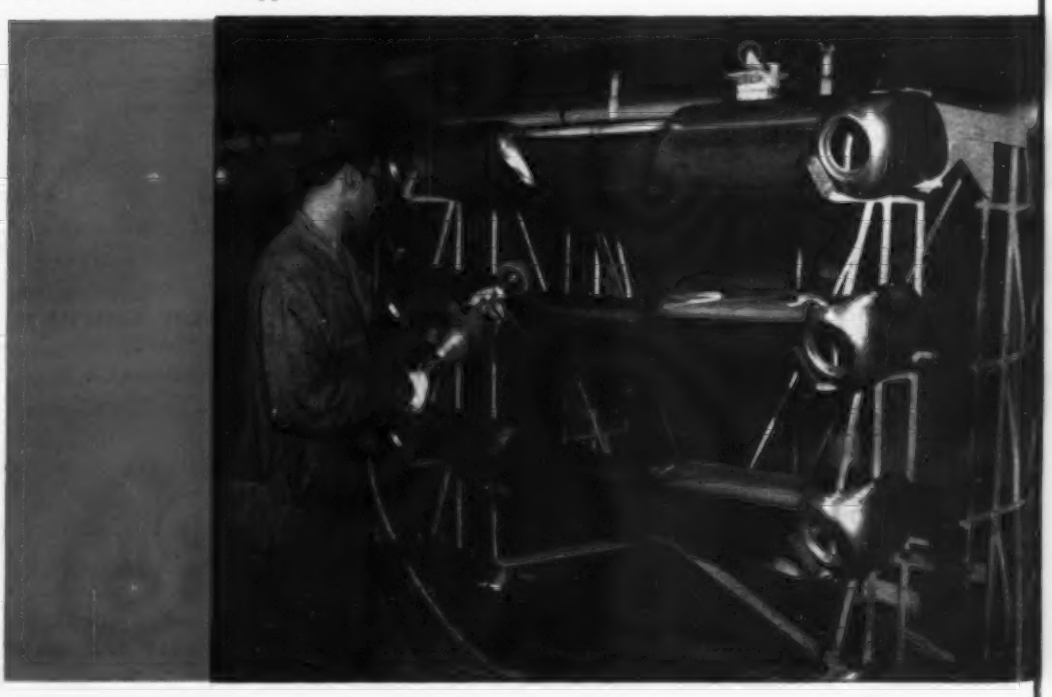
Shown here are the single (foreground) and double (background) Murray-Way Corporation buffing heads used in the completely enclosed automatic buffing line at Ford. Note the bars pass under the buffing heads side by side instead of the normal end to end.

When a rejected area cannot be repaired by hand buffing a set up wheel is used and the bar is re-coppered and buffed.



Buffing while still an art is automated very successfully at Ford's Monroe Plant. Refinements are in the form of major changes in techniques, such as passing the bumper bars through the automatic buffing lines 90° from the normal, using untrimmed and untreated bias buffs, and completely enclosing the automatic lines to provide an extremely clean working area.

BUFFING at Ford's Monroe Plant

By M. M. PATTERSON
Managing Editor

● "Elegance without flamboyance" is a term which Ford Motor Company uses to describe the award-winning styling of its 1959 impact or bumper bars for Ford passenger cars. This term is not only descriptive of the styling but can be considered as a standard of quality for the lustrous finished impact bars produced at its Monroe, Michigan, plant. From the purchase of the sheet metal to the grinding, plating and buffing this goal is considered. The buffing operation is a good example of the thought and control which the Ford personnel have exerted to obtain this high-quality finish.

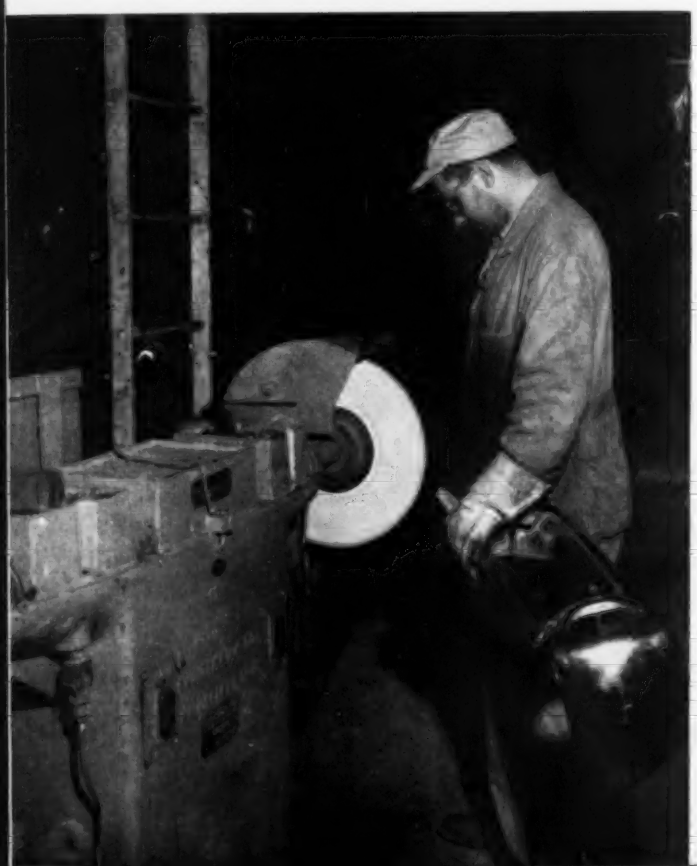
Prior to the buffing operation the sheets are flat ground, phosphate coated, then draw compound applied pressed, and the draw compound coating then removed. The bars then ride on conveyors while they are hand finished for such defects as recoil lines and stretch marks. Hand air grinders are used with either set-up wheels or with belt attachments. The belts used are 2"x20" Aluminum Oxide 180 grit cloth backed. The bars then pass between two rows of twelve adjustable polishing heads which help remove metal stretch when it occurs in an area consistently. Hand air grinders are then used while the bars are still being carried on the conveyor to remove any scratch pattern or pit and slug marks. These grinders use set-up wheels made from 180 grit turkish emery and No. 1 hide fluid. The personnel using the hand polishers move along an eight foot walk beside the conveyors with the bars riding on ten foot centers.

These bars then must pass a 100% inspection. Following the inspection the bars are copper plated. This plating is a bright acid copper.

The copper plated bars that are rejected by the production checkers as they come off the automatic buffing machines, are first buffed by hand. This operation is performed in an effort to repair the rejected area and send the repaired bar directly to white brass nickel and chrome. When the rejected area cannot be repaired by hand buffing, a set up polishing wheel is then used, and the repaired bars go back to be re-coppered and buffed.

The most unique factor about these copper buffing lines is that the bars are moved on the conveyor 90° from the normal for bumper bars. This arrangement was originally developed to cut down on the floor space, but since its installation has proven advantageous for other reasons as well. These advantages include even wear of the buffing wheels with the resultant savings, increased the quality and increased the rate of production by decreasing the distance between the centers of the platens to 30" from the 7'-plus if the bars had been presented end to end.

The buffing lines are completely enclosed which provides for an exhaust system. This arrangement allows for sludge conveyors which carry the sludge outside the enclosure to containers for easy removal and results in an extremely clean buffing area. Mounting the exhaust fans in the roof of the enclosure also



UPPER LEFT
Shown here are the triple buffing heads on the automatic buffing line built by Murray-Way Corp. of Detroit.

UPPER RIGHT
Coated abrasive hand operations are used to repair rejected areas.

LOWER LEFT
Off-hand buffing is performed on the bars to clean up stretch marks before copper plating.

LOWER RIGHT
The automatic buffing lines are completely enclosed. Exhaust fans are mounted above the enclosure.

100% inspection is performed after both steel and copper buffing.

The photo illustrates the mushover as the buffs press against the bars. This mushover is held to ½" and is used as a visual control of the buffing action instead of the amperage as is the case in steel buffing.

cuts down the floor space required for the buffing lines.

The buffing line consists of single, double and triple heads, a total of 30 in all. Sixty-two buffs are operated on these heads. The 62 buffs are made up of 780 buffing sections which range in width from 6" to 24". The sections are all 18" in diameter, 12 ply 86/93 cloth, 2.50 lb./yd. with a density of 9. The purchased sections are unbleached, untreated and untrimmed bias type. By buying the untrimmed sections Ford has been able to cut costs and actually start with a slightly larger buff. 90% of the buffing sections are spaced with from 2-5 spacers.

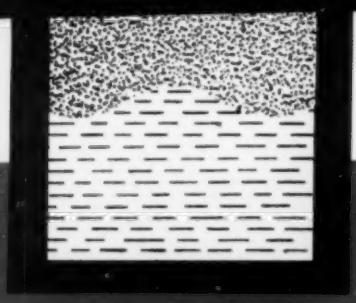
Ford originally started with a 16 ply 3 density section, but have since found the present buffs have increased life from 28,000 to 38,000 bars at a 20% reduction in cost.

The conveyor speed is 20.8'/min. Two buffs are angled to cover each 8" area of the bars with the mushover being held to ½" whenever possible. For steel buffing the pressure of the buffs is determined by the amperage drawn by the head, but copper buffing must be controlled by mushover or the depth the bar protrudes into the buff. Copper removal under the visual control of the mushover is held to .0003".

All locking nuts on the heads are painted with a stripe from the nut to the mating part so that any movement of the setting can be determined by sight. All belt guards have been painted with rotation arrows.

Compound is pumped from the drums to manifolds and sprayed directly onto the buffs. The compound being used is liquid tripoli of 20,000 to 22,000 viscosity with no resins. The compound is forced under 30 lb. pressure through 68PB nozzles. The time cycle for the spray is one second on and forty-two seconds off.

Adjustments are continually being made to maintain the quality of the bumper bar finish. Slight changes in the plating will effect the buffing operation. If the acid has not been completely removed from the bars a discoloration will appear which can not be removed by the automatic buffing line. Hard plating is another problem which may face the buffing line and require changes in the operation. These variations must be intensely watched by Ford personnel to obtain the quality they demand. • • •



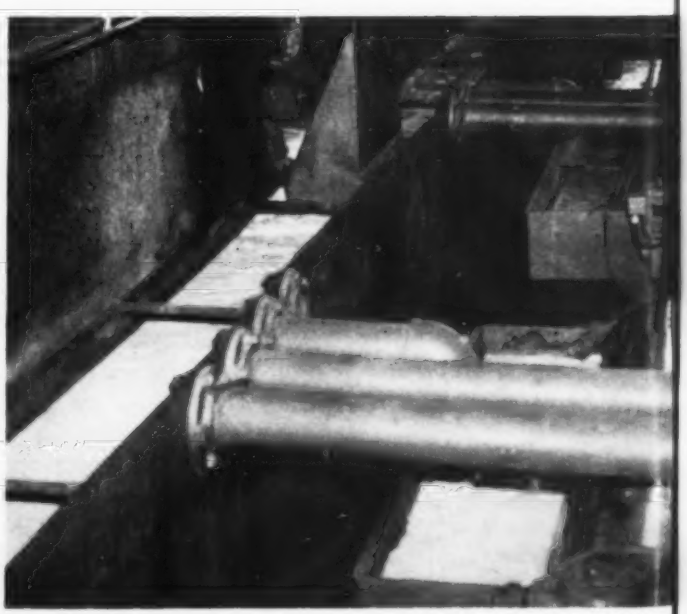
Central Coolant Systems - -

CURE OR CURSE

Central coolant systems can be very beneficial if the conditions envolved are right. This article describes the pit-falls and advantages of a central system. A case history of an extremely satisfactory central system at Arnold Engineering Company provides a practical example.

By A. L. WILSCN
Barnes Drill Company
Filtration Engineer

BarnesdriL Magnetic Separators arranged in tandem. Sludge discharge is serviced by a screw conveyor. Note heavy swarf load on discharge chutes. Pipes across top of separators feed one bank of separators dirty coolant from the grit trap at right.



BarnesdriL Magnetic Separators arranged to receive dirty coolant from grit trap, installed along wall of coolant reservoir house. Baffle in center prevents splash of main flume.

The area shown here contains the machines which are supplied with coolant from the central system at Arnold Engineering Co. Note the cleanliness of the entire shop.

● Will a central coolant system be of benefit to you? This is the question which has faced many plant engineers during a building program. Some have installed a system and been rewarded while others have regretted their decision.

Basically a central coolant system will be advantageous:

If the same coolant is common or can be used on 90% of the machining operations.

If a certain degree of coolant cleanliness can satisfy the requirements of all the machines.

If future planning will not require movement of groups of machines to other locations. Outside the area of the system.

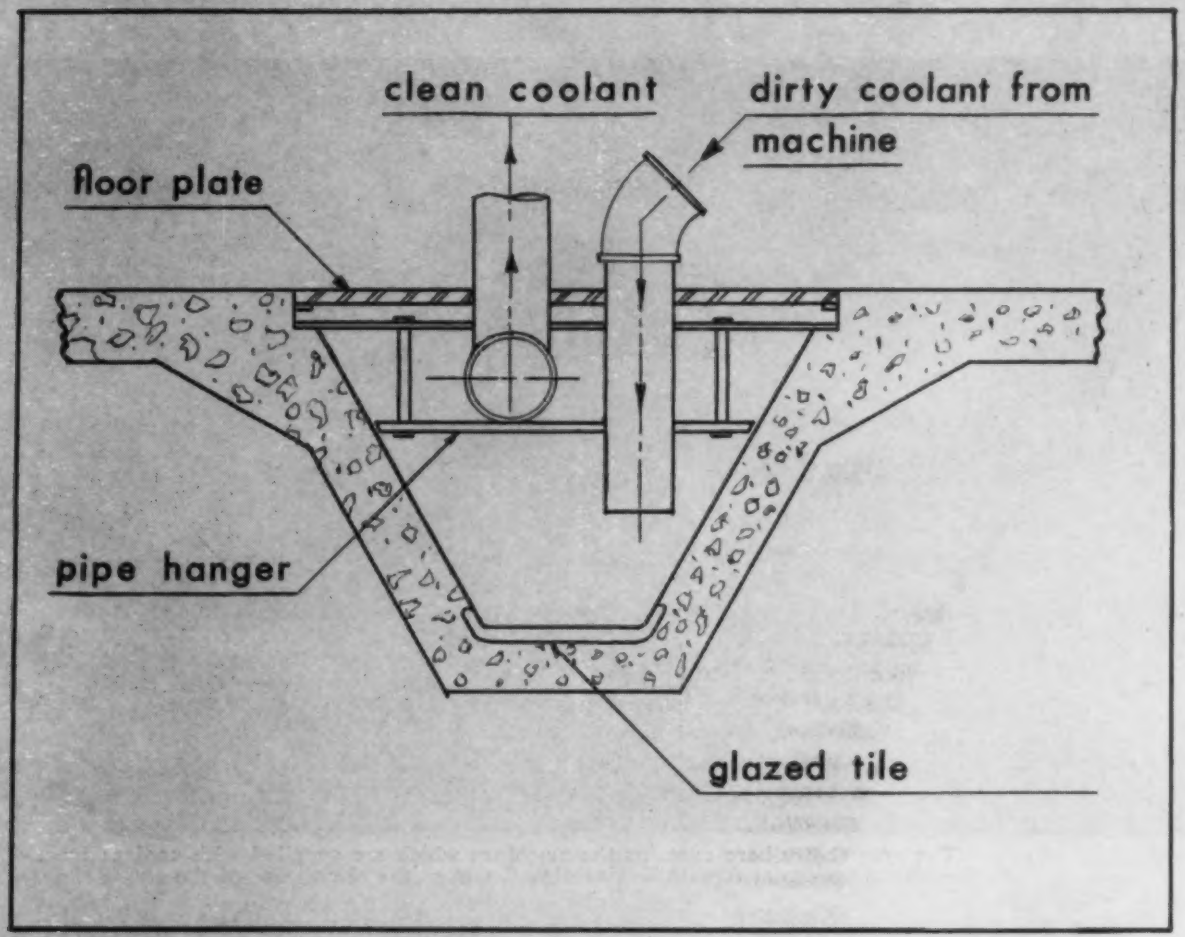
If quality coolant cleaning equipment is installed to service the system.

Time and money can be saved by the required servicing of only a large central storage tank and central pumping system. The elimination of repetitive servicing of 90% of machines using the same coolant will make quite a reduction of maintenance problems. If the coolant system is properly designed, the required addition of coolant concentrate will demand very little time. The cleaning of the central coolant reservoir should be as nearly automatic as possible to take advantage of additional savings. The remaining 10% of the machines could be provided with individual coolants and coolant cleaning systems.

The most stringent coolant cleanliness requirements of any one machine in the central system will dictate the level of which all the coolant must be cleaned. If there are several machines requiring a relatively high degree of cleanliness it is necessary to either install a secondary piece of coolant cleaning equipment or put these machines on an independent system.

The most important aspect of any central system is, of course, the method of solid removal. It may be that a variety of types of machining operations are involved in the use of the central system. The contaminant may be in the form of milling chips, lathe turnings, grinding sludge or some other nondescript types of solids. This situation will require careful selection of the type of cleaning method. The problem may manifest itself in the fact that there is a material handling problem, as well as coolant cleaning. Unless some provision is made for adequate material handling, it is highly likely that the coolant cleaning equipment would not withstand the rigors of the heavy load. On the other hand, if the selection of the coolant cleaning equipment is made on the basis of material handling it is likely that the degree of coolant cleanliness would not be attained.

With the basics in mind we can examine a typical central system installation. The Arnold Engineering Company, a Subsidiary of Allegheny Ludlum Steel Corporation, is one of the nation's largest manufacturers of magnets and magnetic materials. This activity requires a large number of various types of grinding machines and the coolant demands have now reached 1200 GPM. Several years ago, Arnold Engineering operated their grinders using individual coolant systems and it was found that from 1½ to 2 hours of every 24 hours available machine operating time was devoted to tank cleaning and coolant maintenance. Therefore, when plans for future development were in the making, the Arnold engineers considered a central



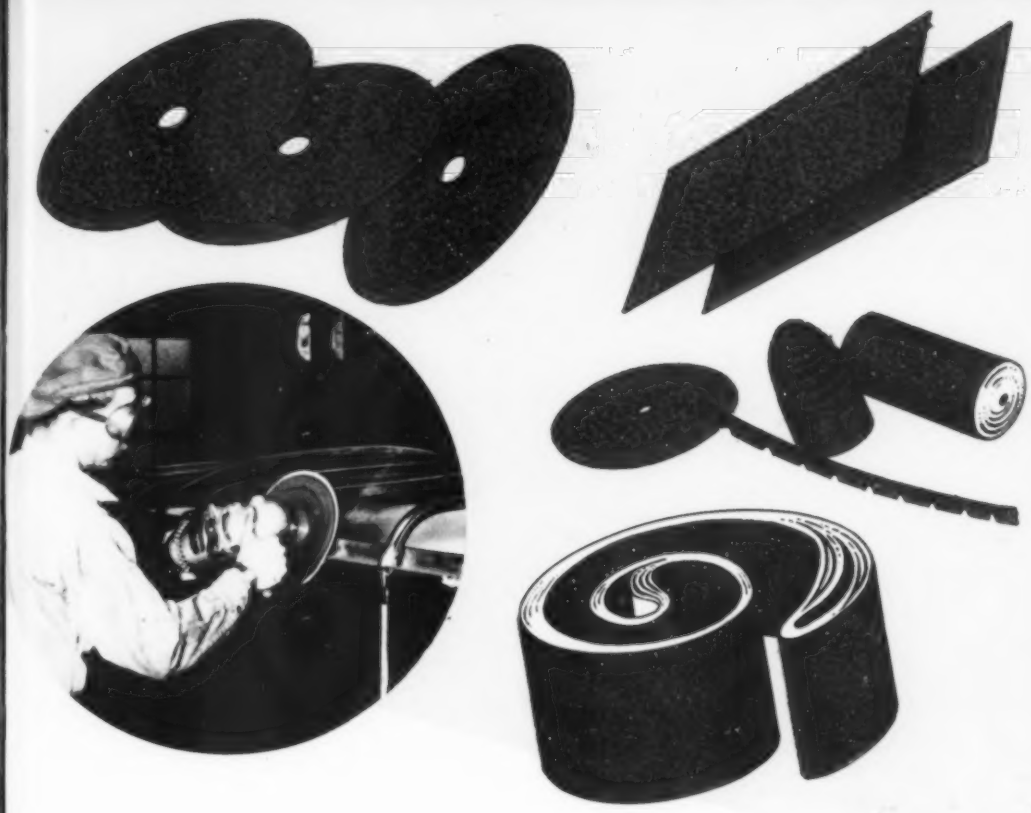
Cross section of trenches used for central system at Arnold Engineering Company.

coolant system. Because they had adequate space available, it was decided that a large central reservoir in an area outside the work area would be most advantageous. Anticipating the demands they now have and allowing for future growth, these men decided on a central coolant reservoir that would contain 50,000 gallons of coolant.

Through the years, Arnold engineers have found that keeping the coolant cool could account for a considerable savings in grinding wheels (50%) and with this new coolant system, they installed a 60 ton Trane refrigerating unit which automatically keeps the coolant temperature between 54 and 58° F. Harder grinding wheels may be used and fastener cutting action occurs because of the cooling effect of this refrigerating unit. Bacteria growth is at a minimum through the use of clean coolant and the problem of any odor or other unpleasantness due to warm coolant is completely eliminated.

These foresighted engineers, who had previously experienced the problems of dirty coolant, took care of this problem along with others before building. Since the Grinding Department grinds predominantly various grades of Alnico and other alloys used to make permanent magnets, it was determined, through past experience and tests that magnetic separation would be the most economical method of cleaning the coolant.

Arnold Engineering Company central coolant reservoir. Note Plate Coils immersed in coolant. Expanded metal grids are walk-ways for service. Note clean condition of coolant.



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A grit 24 Metalite disc mounted on an air portable tool is removing welds from the top radius of steel washer tubs. A steel disc pad is used to back up the grinding disc.

Draw marks on the top side of this steel cooking well are being smoothed with a Metalite fibre disc mounted on a portable grinder and running at 5000 rpm.

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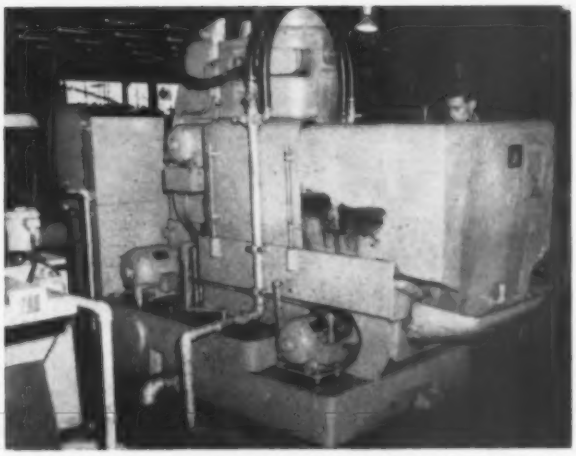
A Model No. 953 Besly Grinder used in grinding Alnico at Arnold Engineering Company. Lower rectangular covered trough is dirty coolant discharge from grinder. Pipe above this trough is clean coolant return to the grinder. Floor plate at lower left covers dirty coolant trench and clean coolant return pipe.



Model No. 18 Blanchard Grinder installed on central coolant system. Large pipe at floor feeds dirty coolant from grinder base to dirty coolant trench. Smaller pipe returns clean coolant to wheel head and chuck.

The fact that the swarf produced by this grinding operation had considerable value in the form of strategic materials which could be reclaimed, necessitated a piece of Coolant Cleaning Equipment that could produce the extracted swarf in a form easy to handle and produce a level of coolant cleanliness adequate for the Grinding Department's needs.

The central reservoir and the cleaning equipment are located outside of the production floor in a building adjacent to the main production facility. Placing this reservoir in this area allows maximum use of the productive area and prevents any obstruction or loss of work due to any maintenance that may be required in the reservoir area and, at the same time, giving complete freedom for work and equipment when their presence is required in the coolant reservoir area.

The coolant is pumped to the machine floor by means of (1) 25 H.P. Fairbanks Morse coolant pump. A 7½ HP "Jockey" pump is available to cut into the coolant line should the demands on the grinding floor exceed the 900 GPM delivered by the 25 HP pump. A second 25 H.P. pump is a stand-by.

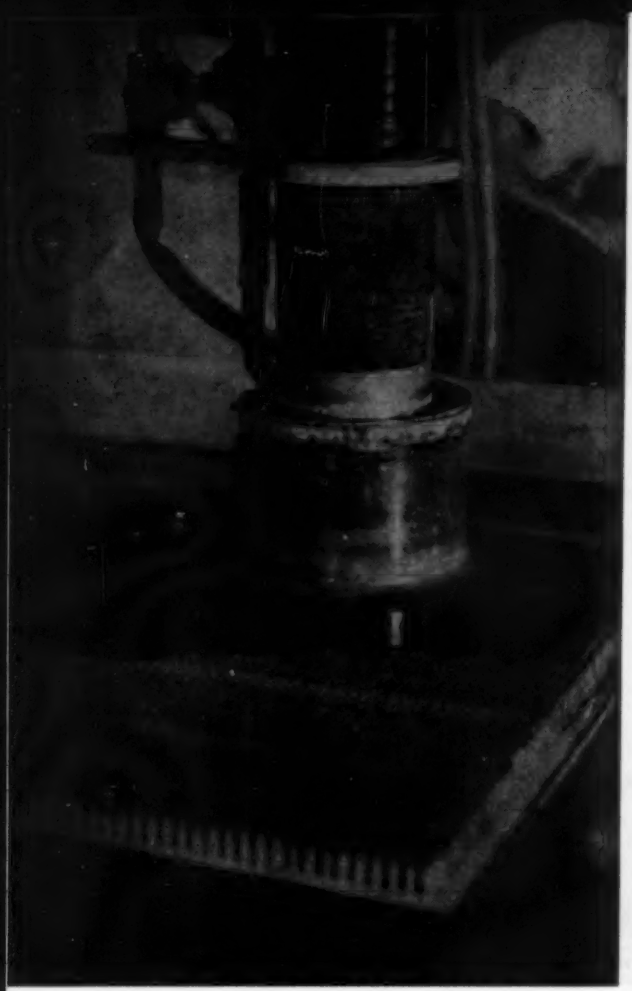
Two banks of four each Model No. 12 Barnesdril Automatic Magnetic Coolant Separators, serviced by a central screw conveyor, are the heart of this coolant cleaning system. An arrangement of 16 feeder trenches directs the dirt-laden solids from the grinders to a main flume. These trenches are cast in the floor. They are lined at the bottom with glazed tile. The pitch is ¼" to a foot and 60° "velocity trench" construction was followed. Flushing nozzles were installed but are seldom used because of adequate coolant velocity in the trench to prevent solids settling.

The main flume feeds a "grit trap" which is highly effective in trapping the abrasive grain before it reaches the Magnetic Separators. This trap is built in such a way that periodic draining into a scavenging sump eliminates the settled abrasive material. The clean coolant return from the tank to the individual machines is provided for by means of piping that runs inside the dirty coolant trenches. These pipes are carried on hangers below the level of the floor. The trenches are covered with floor plates. This arrangement of dirty coolant trench and clean coolant return piping provides a very neat installation with a minimum of overhead piping, no coolant tanks on the floor and, therefore, more available working floor space. The general housekeeping of this shop is excellent.

When it is necessary to add water lost through evaporation or coolant concentrate as needed, a metered water line is opened and the calculated quantity of water added to the system is recorded. Quality control personnel test the coolant daily for concentration and add the soluble concentrate as it is required. There is a critical length of time that the coolant in a central coolant system can be used. If attempts are made to use the coolant over too long a period of time, you may encounter a situation where the components of the coolant become unbalanced. This may be to such an extent it would be more profitable to dump a portion of the entire coolant supply and restore the required quantity of liquid with a fresh soluble oil mixture. Trying to bring the balance of individual chemical components of this coolant back to the original point is quite difficult and inexperienced personnel can make the operation expensive. Out-of-balance may vary with the types of coolant used and may never occur.

Reputable Coolant Cleaning Equipment manufacturers are always willing to assist builders of central coolant systems by recommending equipment, accessories and methods of coolant handling. A project of this type, whether it be for 100 GPM or 1,000 GPM usually requires planning and it is well worth the time and money to put forth adequate engineering effort to prevent you from building a "White Elephant."

• • •



Honeycomb Cores - Ground not Milled

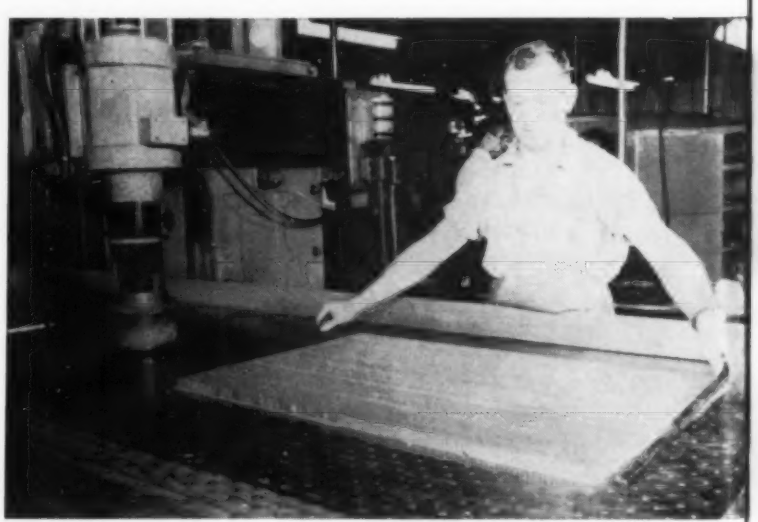
By H. C. MURRER
Application Engineer
The Standard Electrical Tool Co.

Close-up of the Standard Electric Tool Company Electrolytic Spindle during grinding operation

Honeycomb cores require close tolerances and fine finishes. In addition all the burrs must be removed. Formerly this operation was performed by a milling operation through the use of a "baloney slicer" or "valve-stem" type cutter. The grinding of these cores has reduced both time and rejects.

● The air age has done much to promote the quick development of new materials such as honeycomb. Heat resistance, costs and strength-weight ratio have been the factors which have rocketed these new structures and materials to the important position they hold in the missile and aircraft industry today.

Many of these new materials are component parts of structures intended for high temperature service; yet, they are highly susceptible to changes in their molecular arrangement when subjected to localized high temperatures. This molecular change decreases the required strength-weight ratio. (Subsequent factures may develop in these areas, which produce a tangible liability to the finished structure.) Unfortunately, one of the by-products of conventional machining processes is heat. In addition, the ever increasing costs of conventional machining methods, with their required



The honeycomb core is placed on the platen table and measured for small metal strips which will contain the Cerroloy compound within the area required by the core.

slow machining speeds, rapid dulling of cutting tools and resulting unsatisfactory finishes make it absolutely necessary to find new processes and techniques of metal removal.

The following information describes such a production program and how Aeronca Manufacturing Company, Middletown, Ohio, met this problem.

MATERIAL

The honeycomb core section machined in this example is 17-7PH stainless steel 15" wide, 39" long and 0.310" thick, having foil thickness of 0.0015". The finished honeycomb cores are used in aircraft wing sections. These sections reduce panel weights as much as 60% of previous construction. The rivets and stiffeners required for conventional construction are eliminated. The thin metal skins applied to the honeycomb produce smoother aerodynamic surfaces and reduce aircraft drag. The honeycomb core centers absorb and cushion the ultra-high frequency vibration and sound waves produced by the air passage over the areodynamic surfaces, which in many areas, are so critical.

OPERATION

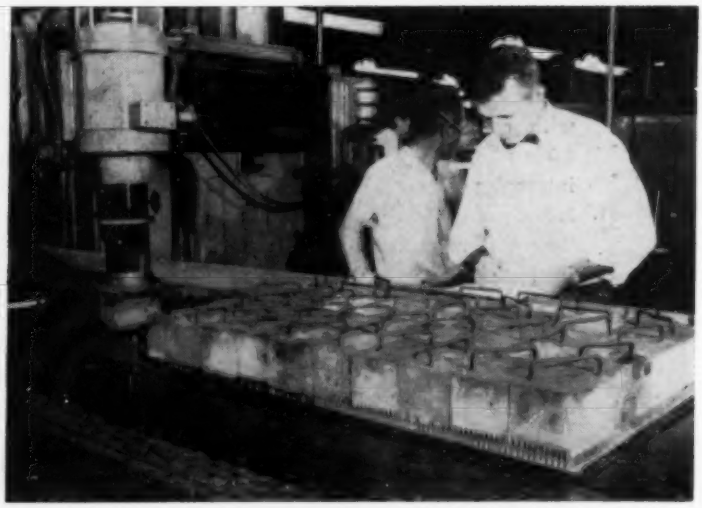
After the foil has been brazed together forming the honeycomb core, the thickness of the rough core must be brought to size. The tolerance average is 0.001 inches TIR for the flatness of each section. The finish is very important, as the finished edges of the foil are brazed to the skin and must join perfectly. This finish is normally held to 3-4 micro inches. Burrs, tears, bends and fingerprints will impair joining of the skin to the finished edges of the honeycomb and therefore cannot be permitted. Formerly, the stainless steel honeycomb cores were brought to size by a slicing operation. This operation was performed on an open side planer using a disc cutter ("a boloney slicer" or "valve-stem"). For each operation a six to eight hour setup time was required.

The electrolytic grinding is also performed on this open side planer, however, the clapper box formerly mounted on the overhead saddle has been replaced by The Standard Electrical Tool Company's 5 H.P. Isolated Electrolytic Super Precision Spindle (Type 2762LY). A 300 ampere Anocut Electrolytic Unit represents the power supply and controls for the electrolytic operation of the spindle. The spindle which carries the direct current from the wheel to the brush rigging must be isolated from the machine mounting. In order to complete the direct current circuit, the current must pass from the work piece to the wheel. By isolating this spindle, it eliminates any current passage from the machine to the spindle at its mounting. This spindle is powered by its integral alternating current motor with variable speeds from 2400 to 4600 RPM by use of a variable frequency converter. During the operation, the spindle operates at 3500 RPM. The wheel used is a 6" plate mounted aluminum oxide metal bonded wheel supplied by Anocut Engineering Company of Chicago, Illinois.

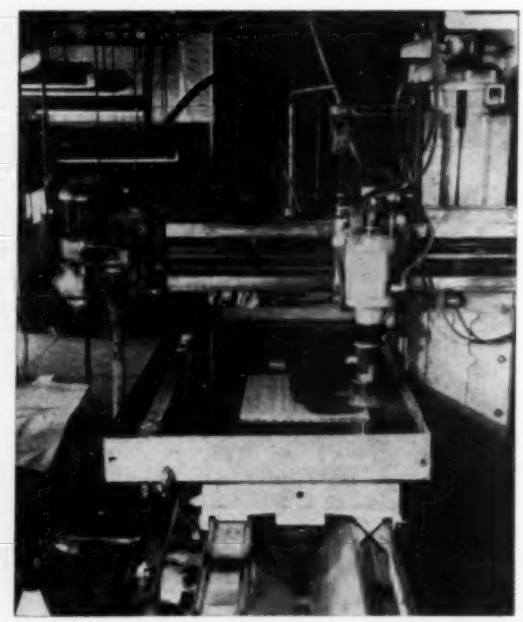
At the start of the operation, the stainless steel honeycomb cores are mounted on a meehanite cast metal platen 11 ft. long, 48" wide and 3½" thick. The platen has been mounted on the table of the planer with adequate spacing for air ventilation between table and platen. The platen has been designed with internal piping so that it can be quickly heated by steam and cooled by water passing through the piping. To clamp the honeycomb core to the platen, the platen is first steam heated. A Cerroloy holding compound, a low melting metal alloy, previously heated to its molten state is poured on to the platen to a depth of about ⅛" and into a frame work of metal strips which outlines the shape of the core. The platen has ⅜" deep holes about 2" apart to keep the holding compound from squeezing out from under the honeycomb core when it is pressed into contact with the platen. The honeycomb core is positioned within the (removable) frame-work which contains the thin layer

The operator is shown pouring the molten Cerroloy on the platen within the metal strip frame.

The honeycomb is being placed in the frame covered with liquid Cerroloy compound. The platen is steam heated at this point to keep the Cerroloy in a liquid state.



Kirksite blocks are placed on the core to hold it in place while cool water is passed through the platen to harden the Cerroloy.



End view of the open-side planer during initial cut.

Steam is again passed through the platen table to melt the Cerroloy compound and allow the operator to break the core from the table.

of molten Cerroloy compound, kept in its molten state by the steam heated platen. After the core has been properly positioned, Kirksite block weights are placed on top of the core to insure parallel contact with the platen. These blocks are approximately 4" cubed and weigh 23 pounds each. When the blocks are in place, the steam passing through the platen is turned off and cold water is circulated until the holding compound completely solidifies. The operation to this point has taken about twenty minutes and the core is ready for machining.

Using an index per pass equal to half the diameter of the wheel (3 inches) rough cuts of 0.030" and finish cuts of 0.005" are taken on the honeycomb core. The planer table travel during these cuts is 24" per minute. Approximately ten minutes is required during both the rough and the finish cuts.

After machining, steam is again passed through the platen softening the Cerroloy compound and the core is removed in less time than that required for mounting. The core, in some cases, is then steam blasted or submerged in a light solution or organic acid to remove any Cerroloy which may adhere to the core. The core is then brushed to remove any small particles which cling to the edges by magnetic attraction.

Rejections, which were previously so numerous, due to "lay-over" burrs, tears or distortions (due to grinding pressures) are eliminated. Where localized heat problems had previously existed, they are now eliminated. There is no noticeable temperature change of the finished surface, before, during or after the electrolytic process.

SUMMARY

Electrolytic Metal Removal has already solved many of the difficult machining problems in the aircraft and missile field. It has also been used successfully on some "problem jobs" in the area of general industry. However, there is an ever-increasing tendency on the part of general-industry to review their difficult jobs along the lines of the electrolytic method. New applications are being uncovered daily.

The thinking of many people is that if a job can be done conventionally without any major problems then the electrolytic method is not for them. Obviously, it would be slower and more expensive. However, units with much greater amperage capacity and new and improved electrolyte solutions, facilitating greater metal removal rates, may make jobs, now being done conventionally, good prospects for Electrolytic Metal Removal.

As the metal is removed by an electro-chemical action, and not a mechanical force, the construction of the machine tool must only support the spindle and the small torques produced during spindle starting. The cost differentiation between the lighter and heavier machine tool construction, and the savings realized can be quite substantial. • • •

Training Provides the Plus

When an operator really knows how to use any tool or machine, his company gets full benefit out of it. A case report on Royal Oak Tool & Machine Company's two-day training program for lead men and supervisors.

By W. A. JOHNSON
Sales Manager
Royal Oak Tool & Machine Co.

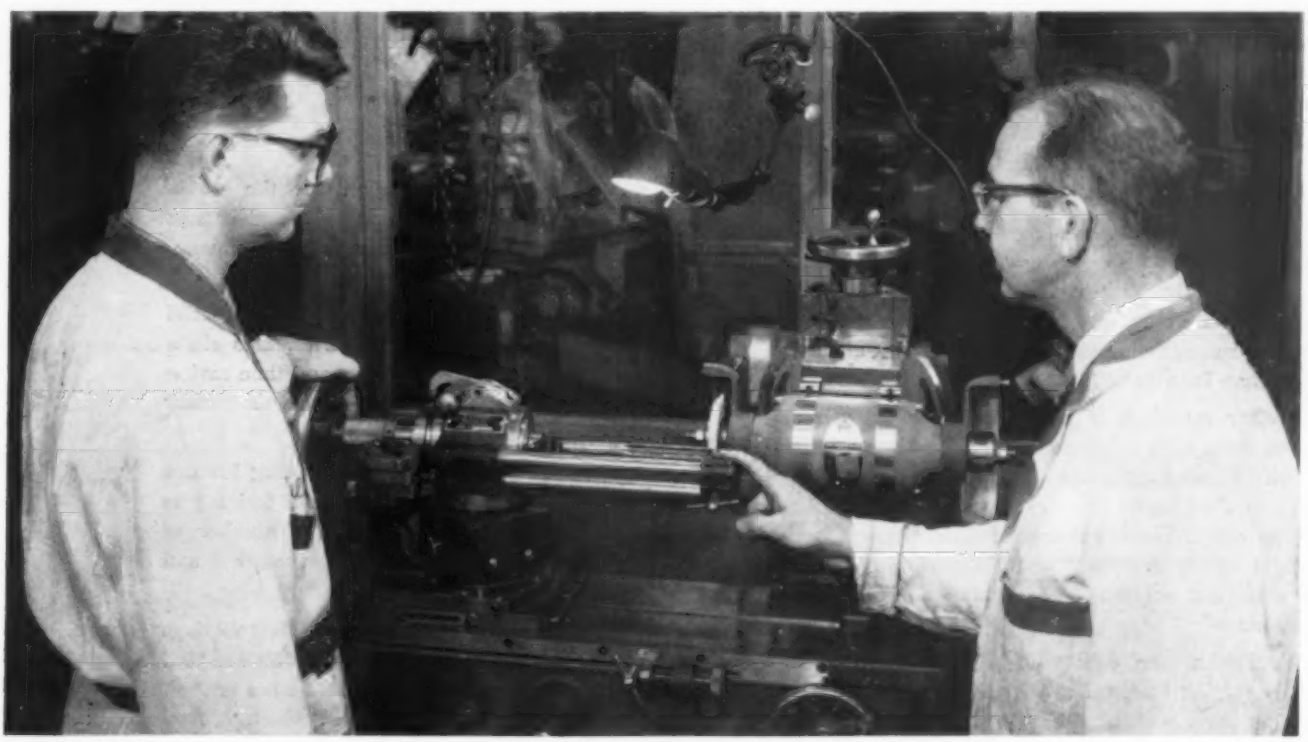
● Walk into any shop in the country, and you'd probably find a boxful of attachments that would save a pocketful of money if they were used to full advantage. Maybe the instructions have been lost. Perhaps there was no instruction, or the operator who received it has gone on to other jobs. Maybe there is some simple problem in set-up or operation that is keeping them from full use. There are dozens of reasons. But in the meantime the tool isn't being used as it ought to be, the loss continues, and the plus that the company could have had is not being realized.

The training program on the Royal Oak Tool & Machine Company's universal form relieving fixture is designed to overcome this difficulty. The fixture enables tool grinders to do some jobs that they previously could not do. It cuts down the time and difficulty of set-up on other jobs. And while it is not complicated, an operator needs some know-how to use it to best advantage.

Designed for individual instruction, or at most for two operators at a time, the program includes fourteen hours of explanation and practice spread over a two-day period. Most companies send one man, though some have sent lead men or supervisors from both the day and the afternoon shifts. Since the program was announced last August, some 43 men, from companies scattered over most of the United States and Canada, have completed the training.

The basis of the instruction is an established series of exercises designed to demonstrate the range of operations which are possible with the fixture. Because the instruction is individual, however, it is possible to omit or give greater emphasis to certain of the problems, as each trainee requires.

The program is laid out to offer a maximum of set-up and tearing down of equipment. This gives each



Jack Romanson (left), master mechanic from the Emco Company, London, Ontario, looks on and listens as the author explains the set-up and motion required in resharpening reamers.

trainee considerable experience in the changing of cams and similar operations. In addition, each job is done from beginning to end, with each trainee setting up and dressing all the grinding wheels required for the grinding of the cutters.

During his two days of instruction, the trainee is under close and informed supervision. Each type of job is demonstrated, and with a sequence designed to create the type of problems that plague a beginner in the use of the fixture, the trainee has a chance to get answers to his questions as they come up.

At the beginning of his program, each trainee is given a short demonstration and explanation of the use of the fixture. Following this part of the session, he puts on a shop coat, and the rest of this instruction is actual operation of the fixture for the most part, with the remainder made up of watching demonstrations and listening to answers to his questions. Always the major emphasis is on the operation of the fixture.

In the formal course outline there are twenty-two projects, with time allowed for grinding special tools which the trainee may have brought with him. Since the instruction is individual, however, there is ample opportunity to skip certain units which may not be so essential, and to place more emphasis on those which are of greater interest in individual cases. In every instance the trainee first secures the fundamentals of the operation, and progresses from the less difficult jobs to those of greater complexity.

One of the first operations taught is the re-sharpening of three-flute taps, illustrating the simple method that is required to time the tools to the cam. The next is the re-sharpening of two-flute tap chamfers. When the trainee is familiar with these two operations, the re-grinding of other tools of similar nature is obvious. Further experience in this area comes in setting up for and grinding chip drivers on both two- and three-flute taps with a formed wheel, as well as with a small mounted wheel on a high speed spindle. Four-flute tap chamfers, plug taps and bottom taps follow in order.

The next operation in sequence is the re-chamfering of reamers with centers, as well as without centers, using a bushing and a steady rest. The latter operation is a means of lengthening the life of a reamer, since these are often discarded after the center has been removed.

Another operation in the sequence is the grinding of step drills with axial and radial relief from a formed wheel. Trainees are taught to use a bushing to support the drill, since this permits taking out and replacing the drill without loss of concentricity. It also permits faster grinding, since supporting the work close to the grinding wheel allows greater stock removal.

Grinding a step drill with a cutting pilot and a square cutting face, using a large wheel, is one of the trickiest parts of form relief work. The trainee is taught in this operation an empirical formula for arriving at the proper tool-to-wheel center relationship. The succeeding set-up is for grinding a drill with a square

Putting the explanation into practice, Romanson is grinding a reamer to secure both axial and radial relief on the chamfer.

shoulder and a cutting pilot, using the high speed spindle and a small wheel. This shows the trainee how much easier this is. The last grinding operation on step drills is on one with a square shoulder and a circular pilot, using a large wheel, 3" to 5" in diameter.

The next operation is to set up and grind an extra-long cutting pilot on a drill with an angular shoulder, using multiple timing, which is not an uncommon operation. This makes it possible for an operator to cam relieve drills with extra-long pilots in two or three settings.

Among the other operations taught are the grinding of milling cutter diameters, end mills and bottom drills, and the use of special cams to grind square, hexagonal and triangular shapes.

Crush dressing of grinding wheels to grind special form cutters is another item in the series. This alerts the trainee to the possibilities of labor and time saving resulting from the use of repetitive type tools ground with crush dressed wheels.

Though the R-O Universal Form Relieving Fixture is basically for tool room work, and the training is focused on that objective, it also has a number of applications in production, including asymmetrical and symmetrical parts and cams.

By the time a trainee has completed his two days of instruction, he is qualified to use the fixture and to instruct others in its use. In addition, he has enough knowledge to visualize other ways in which it may be utilized. Thus he is in position to recommend other applications of the Royal Oak fixture in his own plant.

• • •

"X-ray" view of wheel shows pronged anchor bushing and safety ring.

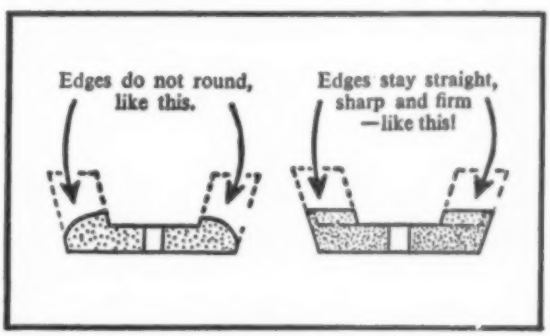
The fast, safe wheel for portable grinding!

The new U. S. ROYALITE HARD SHELL CUP WHEEL

The above cutaway drawing shows the safety secret of U. S. Royalite®: *the pronged anchor bushing and safety ring constitute a reinforcement that makes a safer and a smoother-running cup.* And Royalite's tougher rim keeps the edge sharp for the full life of the wheel. For today's lightweight portable grinders, this is the most economical, most efficient wheel.

The U. S. Royalite Hard Shell Cup Wheel is just one of several new grinding wheel developments coming from U. S. Rubber. Get in touch with wheel specialists through U. S. Rubber, 10 Eagle St., Providence, R. I., your local "U. S." District office, or by writing us at address below.

Using a lightweight grinder equipped with a Royalite Hard Shell Cup Wheel to snag a grey iron man-hole cover casting. The combination of this grinder and the safer, smooth-running Royalite Wheel means a better job in less time—with less worker fatigue.



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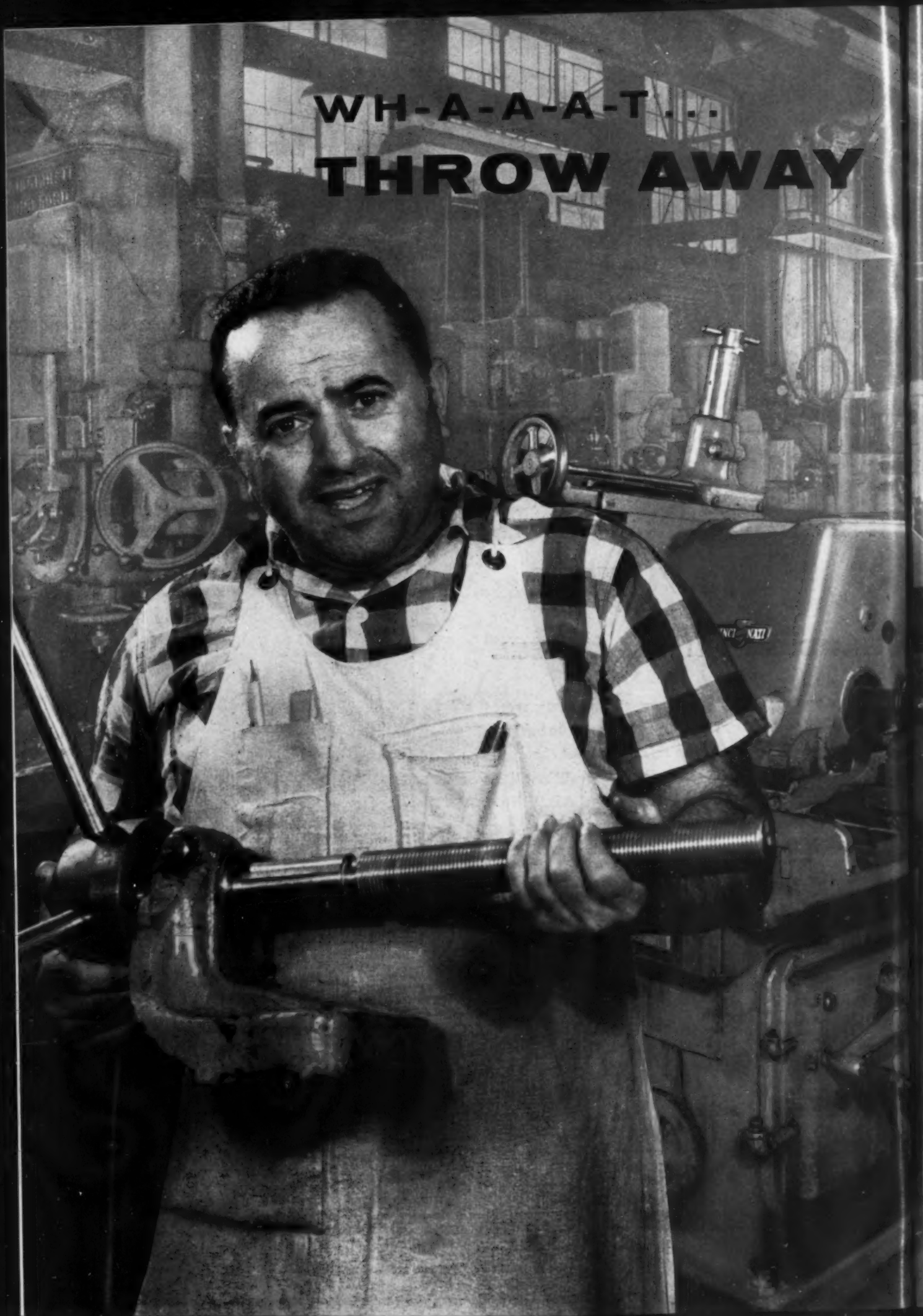
WH-A-A-A-T...
THROW AWAY

THE LEAD SCREW?

"I think the boss is cracking up!

"He says he's got a new way to close up my centerless grinding tolerances to ± .000025" . . . and still turn out better work faster! How can anyone do that, I ask you?

"He says this new gadget—the INCHWORM Motor—will eliminate the lead screw, and get rid of backlash too.

"He's gotta show ME—before I believe what he says about this—what was it—INCHWORM?

"Here's what he claims the INCHWORM Centerless Grinder Control will do for us!!!"

- **Hold Closer Tolerances—**
  by eliminating lead screw backlash
- **Increase Production Rate—**
  by providing "space age" control of grinder
- **Eliminate Rejects—**
  by positioning regulator wheel slide more closely
- **Increase Operator Efficiency—**
  by reducing operator set-up time and supervision
- **Increase Profits—**
  by making final assembly easier

Growth Potential

The INCHWORM is the basic part of a self correcting machine control system. Just add the *MICROtrol* building block elements, set the controls and it will produce parts to sub-micron tolerances automatically. *MICROtrol* elements control the production cycle by electronically inspecting each piece, feeding back the necessary correcting information, actuating the INCHWORM Motor to make the correction, and sorting the finished pieces as they come off the machine.

AT NO EXPENSE TO YOU . . .

The INCHWORM Motor can be installed on your centerless grinder in less than an hour—and prove itself almost immediately. We will install it in your plant, on approval, *upon the recommendation of our sales engineer.*

Send for the complete story!

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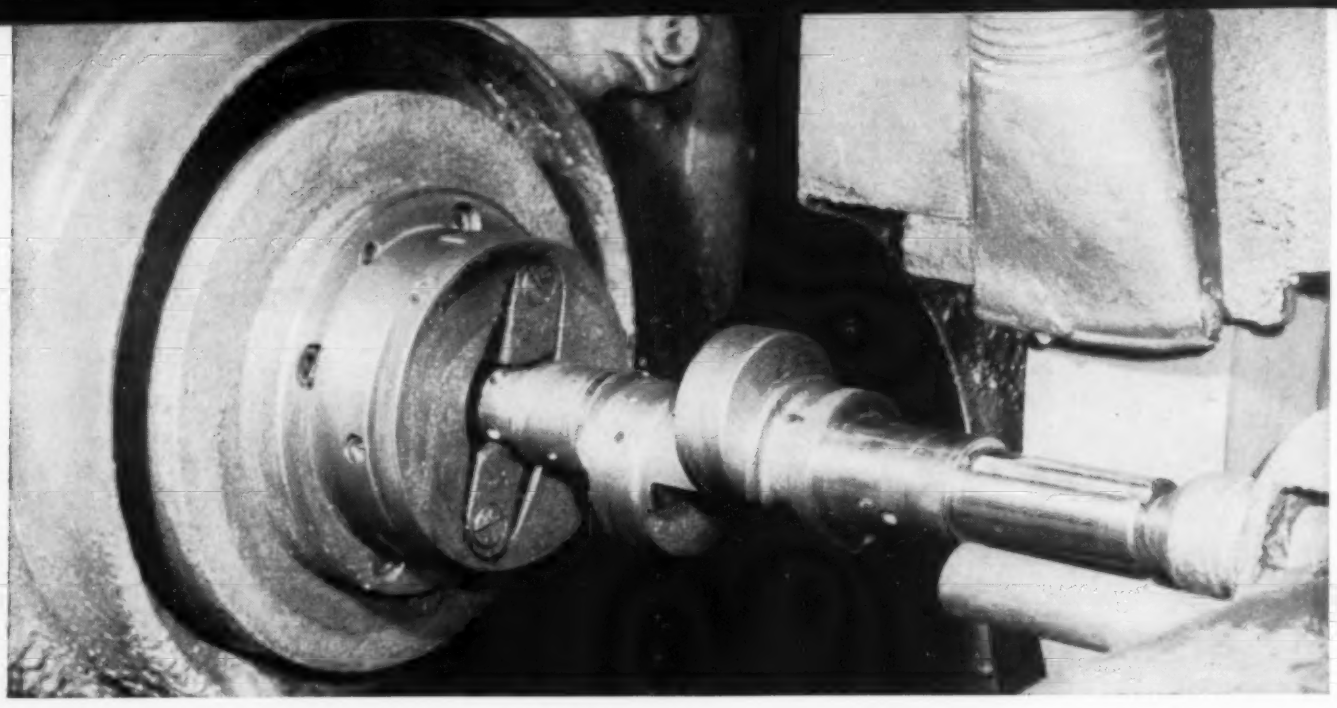


Figure 1. In the crank shaft grinding operation illustrated above, the installation of work drivers cut grinding time from eighteen seconds to twelve seconds, allowed each operator to handle two cylindrical grinders instead of one.

For Cylindrical Grinding Work Drivers Boost Production

In looking for ways to boost production, don't overlook the possibilities of savings from quick-acting work holders. For cylindrical grinding and similar operations, work drivers hold the piece securely, increasing production and reducing scrap.

By EDWIN R. SMITH, JR.
Executive Vice-President and General Manager
Seneca Falls Machine Company

● "Thinking big" about more efficient production is frequently done in terms of either automation or electronics, the glamor concepts of modern industry. Carried too far, such thinking may result in overlooking the many situations, and grinding operations are often in this category, where the application of relatively simple tools will bring about increased production, reductions in scrap and tool breakage, and increased safety.

One of these tools is the self-centering work driver. In the application shown in Figure 1, for instance, a crank shaft grinding operation at the Carrier Corporation in Syracuse, New York, the use of work drivers saved six seconds per piece on an eighteen-second machine cycle. This saved enough time to permit one operator to man two cylindrical grinders, instead of one, with consequent savings in labor costs.

Although it is difficult to determine exactly when work drivers first came into use, it probably happened sometime early in this century. The work driver was developed to provide a simple, quick-acting and positive method of driving work held between centers. A method, in short, which would eliminate the use of dogs.

In traditional methods of rotating work between centers a gripping mechanism known as a "dog" was employed. Essentially a dog is a device attached to the workpiece by a set screw. Its function is to revolve the workpiece between centers when a projection or "tail" of the dog enters a slot in a face plate mounted on a lathe headstock spindle.

The work driver was developed in an attempt to improve on the dogging mechanism. Improvements

Seemed likely is the following areas:

1. Increasing production by decreasing work loading and unloading time.
2. Decreasing scrap loss and tool breakage caused by work slippage.
3. Increasing operator safety by eliminating projecting screws that could catch in clothing.

In principle the work driver operates by using the operating torque of the machine to force serrations on the driver jaws against the workpiece. The necessity for manual dogging is eliminated, because it is no longer necessary to mount and remove a dog each time the workpiece is changed. A twist of the wrist is sufficient to engage or disengage the workpiece and the work driver.

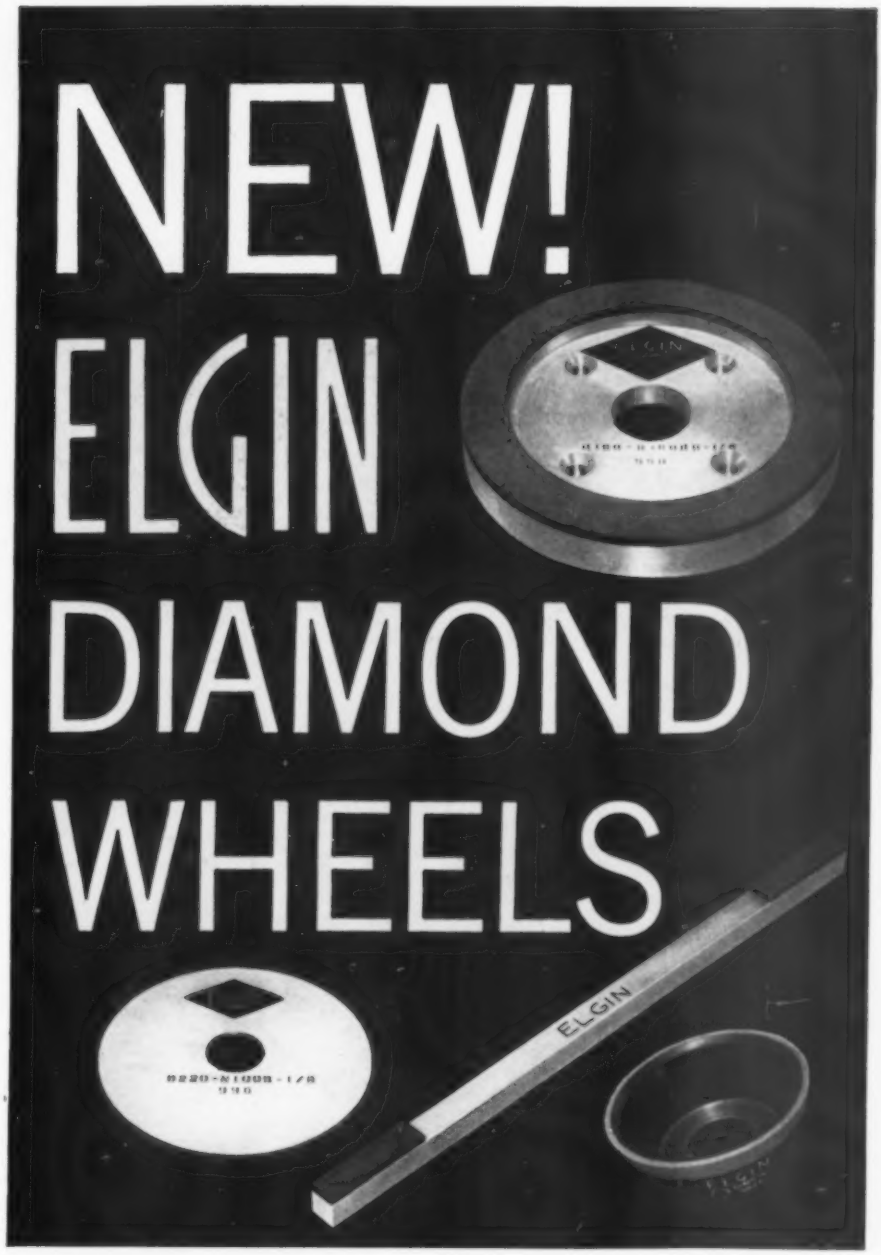
In the use of a dog, each set screw necessarily exerts force in a very restricted area, and this force, once the screw has been tightened, remains constant. These two factors of limited area and constant force open the way for scrap loss and tool breakage.

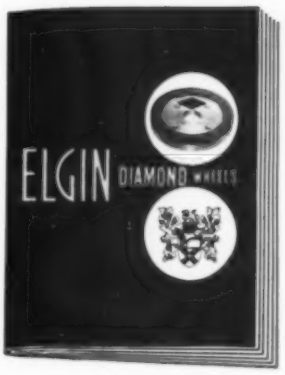
If a set screw is not turned down with sufficient force, or if it is set on a high spot of a shaft that is even slightly eccentric, work slippage may result as the tool is fed into the workpiece. This in turn may cause scrap and even tool breakage if the carriage feed is not instantly disengaged.

Work drivers are designed to eliminate these problems. A typical work driver has two jaws, which provide substantial gripping area. The jaws are serrated and tighten automatically in relation to depth of cut—the harder the pull, the tighter the grip. A self-centering slide that automatically adjusts itself to variations between the center and the outside diameter of the workpiece takes care of reasonable eccentricity in the workpiece.

Driver slides are available for light, medium, heavy and extra heavy duty, while jaws can be furnished with coarse serrations for heavy roughing cuts or fine serrations for light finishing cuts. The angular serrations on the jaws provide an overlapping contact for surer and quicker grip on smooth finished as well as hot rolled stock and forgings having a relatively hard surface.

Work drivers can be used on both plain and universal grinders, or on any type of engine lathe, for work diameters varying from ¼" to 6⅞". • • •





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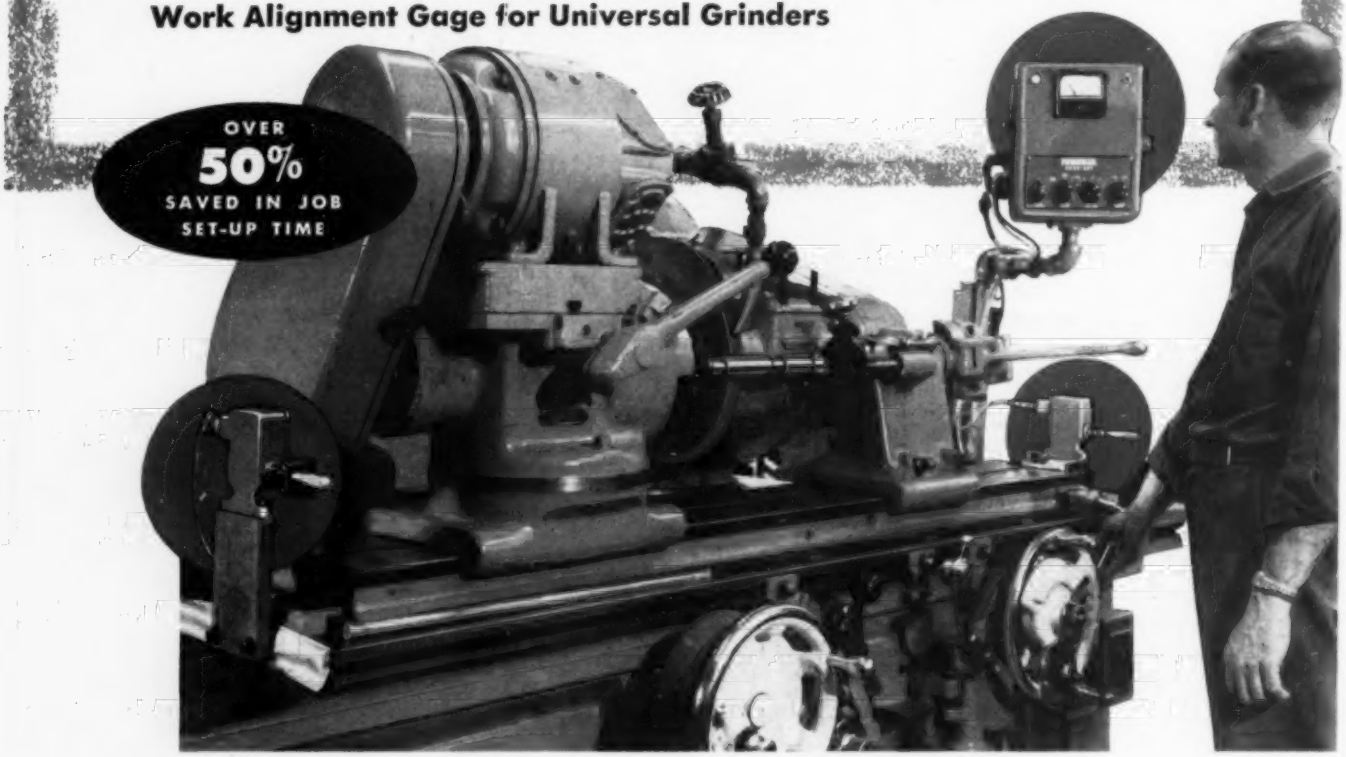
the Sure-set FAST ACCURATE ABSOLUTE

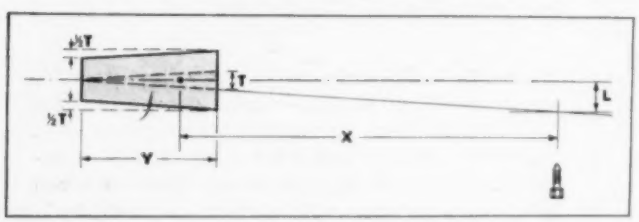
Work Alignment Gage for Universal Grinders



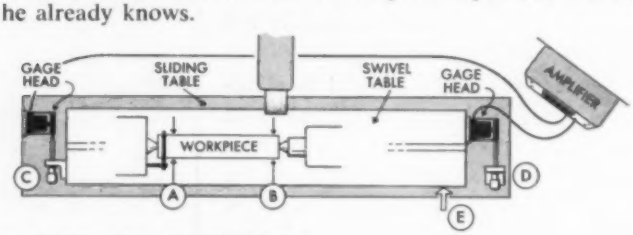
HOW THE SURE-SET PROVIDES *ABSOLUTE* CONTROL OVER WORK POSITIONING

(1) The Sure-Set is an electronic work-positioning gage which guides the operator in making the *exact amount* of swivel table adjustment needed to eliminate unwanted taper or — conversely — to produce a specifically desired taper, so that a part can be produced successfully *WITH ONLY ONE TRIAL CUT*. There is no restriction on workpiece length or table length.

(2) The Sure-Set shows the operator when he has made the table adjustment correctly by showing actual table position. And, because it shows how much *each end* of the table moves, the operator can make correct adjustment, EVEN THOUGH THERE IS PIVOT LOOSENESS, STICK-SLIP, OR ACTUAL BENDING OF THE TABLE . . . conditions which occur in MOST grinders.



(3) The Sure-Set electronically compensates for the difference between length of workpiece (Y) and the distance from table pivot to adjusting screw (X). This is important because it permits the operator to make the correct table adjustment (L) without first having to stop and calculate what it actually should be. The Sure-Set is able to save the operator this calculation by charts, graphs, and mathematics because its meter (graduated in .001" or .0001") reads in terms of the workpiece taper (T) which he already knows.



A HARD JOB MADE EASY

The Sure-Set saves over 50% set-up time by eliminating trial-and-error grinding and repeated checks. Here is the procedure: Take trial cut . . . gage work at two points (A and B) to determine taper . . . set compensating switch on Sure-Set amplifier to match distance between A and B points . . . watching meter on amplifier, zero each gage head by adjustments at C and D . . . adjust swivel table at E until meter reading for *each* gage head matches the amount of taper . . . TAKE FINISH CUT. Total elapsed time — 2 to 3 minutes!

You'll be amazed how much time and money the Sure-Set can save! For further information contact your local FEDERAL representative or write . . .

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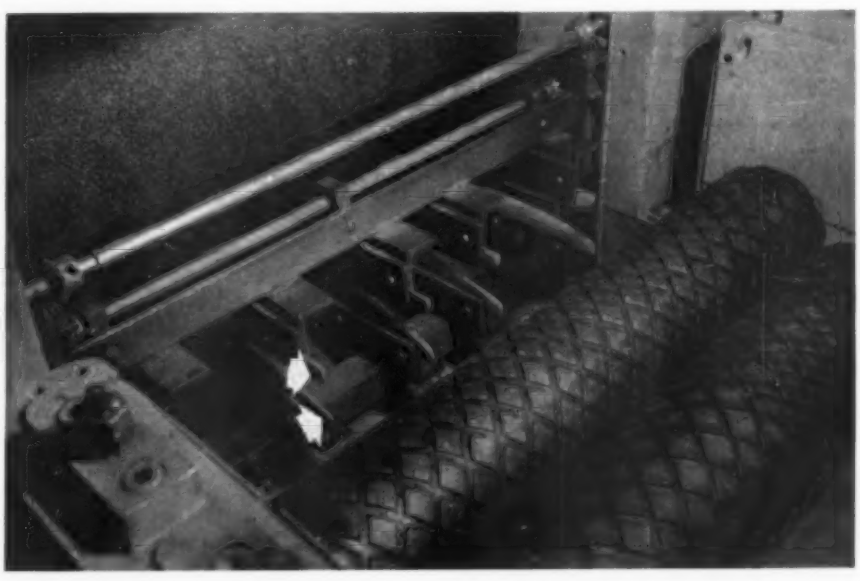
Ideas from the Shop

Balancing a sewed cloth wheel. The wheel has been mounted on an arbor, which in turn is placed on a balancing stand. Three wood screws have been inserted into the wheel and a fourth is ready.



Arrows indicate placement of nylon guides on a 50-in. grinder. The guides are used at both infeed and outfeed positions.

BALANCING OF CLOTH POLISHING WHEELS

By H. J. GERBER

● Balancing of sewed cloth wheels is a simple matter if the illustrated procedure is followed. The wheel is mounted on a hardened, ground, and polished arbor which is made to a snug fit on the wheel. The wheel and arbor are placed on the knife edges of a properly leveled balancing stand just as a grinding wheel is tested.

When the heavy side has been located the wheel is weighted on the opposite side by inserting a number of ordinary wood screws into the side surface of the wheel. Holes are drilled with a portable electric drill to a size slightly smaller than the screw diameter and as many screws as are required are driven into place.

The whole operation takes but a few minutes and will noticeably improve the polishing operation.

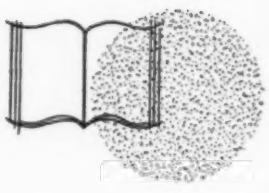
TAPERED GUIDES HALT CHATTER

● A simple set of tapered nylon guides, easily applied in the ordinary shop, has licked the buckling tendency of light-gauge metal in pinch-roll grinding and polishing equipment.

Commonly, this vibrating trouble occurs as the work both approaches and leaves the abrasive belt. Often it results in chatter marks on the work.

Product engineers at Behr-Manning Co., manufacturer of coated abrasives, modified the feed system on standard pinch-roll machines by adding a simple framing of angle iron to hold tapered guides of molded nylon ⅛-in. thick and about 10-in. long. The nylon is clamped in place between cold-rolled strips, thus can be installed and replaced quickly.

The nylon strips are mounted both above and below the work, and completely eliminate the troublesome flapping. The clamping method permits the guides to be spaced accurately to accept sheets of different thicknesses.



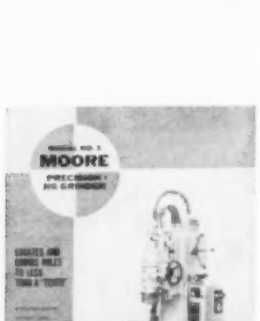
Literature

1. Precision Jig Grinder, Moore Model No. 3, is demonstrated as to its exceptional locational accuracy in an illustrated brochure. After holes were bored on a No. 3 Moore jig borer, a four-hole steel plate was ground on the jig grinder. The locations were then measured by five technicians on the Moore universal measuring machine. Their readings showed a maximum difference in measurement of 30 millionths. Detailed specifications and performance data are covered. Moore Special Tool Co., 800 Union Ave., Bridgeport 7, Conn.

2. Portable Pneumatic Grinders. Catalog PT-58 covers the manufacturer's recently-introduced line of portable pneumatic grinders which includes both powerful horizontal grinders and high-speed die grinders. Data is given on four models of pneumatic die grinders, which are designed for use wherever filing, grinding, cutting, and polishing are performed. Two of the models have a speed of 60,000 rpm and two, 40,000 rpm. Six basic models in the horizontal grinder line are illustrated. The horizontal grinders are available in various sizes and models with speeds from 3,100 to 12,000 rpm. Selection tables are provided for 4", 6", and 8" heavy duty models and for 8" extra-heavy duty models. Auxiliary equipment is illustrated and described in detail. Thomas C. Wilson, Inc., 21-11 44th Ave., Long Island City 1, N.Y.

3. Diamond Wheels for Carbide Grinding. The usefulness of the manufacturer's diamond wheels are described in recent folder, with shapes of the wheels diagrammed to help the customer in his selection. "Starting recommendations" (for the six most common applications) show wheel type, wheel number, size, grading and application for wheels. Usually only a minor change in grit size is required to adapt to special conditions. The bond types include resinoid bond, used for fixed infeed grinding, and metal bond, with smaller usage in carbide grinding but increasing in popularity. Any of the resinoid bond diamond wheels are available with man-made diamonds. The Carborundum Co., Niagara Falls, N.Y.

4. "Resharpening of Milling Cutters," a cost-saving application of Anocut electrolytic machining, is discussed in Bulletin No. 130. Under the heading of How Anocut Cuts Costs of Cutter Grinding, it is



(See Number 1)

pointed out that the process speeds operation because it removes metal faster; permits a plunge-grind technique—only one plunge per tooth edge to finish the job; removes steel and carbide together, and requires only one set-up, only one wheel, to do the job. Arranging a standard machine for Anocut electrolytic operation is discussed also. How electrolytic metal removal works is shown in diagram form. Anocut Engineering Co., 631 W. Washington Blvd., Chicago 6, Ill.

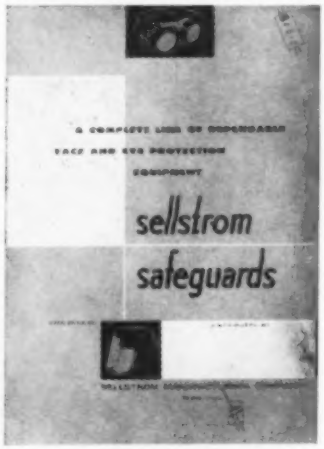
5. Safety Devices, which protect users from all types of face, head and eye injuries, are covered in 26-page catalog. Goggles and glasses, replacement lenses, face shields and replacement windows, and industrial respirators are among the products illustrated, with writeups as to their makeup and sizes. Style and comfort have been emphasized in the products to encourage their constant usage whenever hazardous conditions are present. Sellstrom Manufacturing Co., Highway 53 at U.S. 14, Palatine, Ill.

6. Tungsten Carbide Blades for Wheelabrator airless abrasive blast cleaning equipment are described in a recent bulletin. The blades were designed specifically for use in Wheelabrator abrasive blast wheels to provide long life and reduce blade cost in the toughest cleaning applications, even with heaviest sand contamination and under the most severe operating conditions. Price information is included, and blast wheel sizes for which the blades are available. Wheelabrator Corp., 1169 South Byrkit St., Mishawaka, Ind.

(See Number 2)

7. Electrostatic Chucks, as described in illustrated folder, are said to be the first chucks to achieve practical application of electrostatic rather than electro-magnetic force for chucking small parts. Both magnetic and non-magnetic metal workpieces can be chucked. Any electrical conductor such as aluminum, copper, bronze, brass, stainless steels, magnesium, etc., as well as the ferrous metals, can be held on this type of chuck. The basic equipment units in the system consist of the Electroforce chuck, the power supply, the Dri-box, and the dielectric coolant unit. Standard Electroforce chucks are designed for use with a 6"x18" or larger surface grinder. Electroforce, Inc., Fairfield, Conn.

8. "The Evolution of a Modern Cutting Fluid" describes the development of cool-



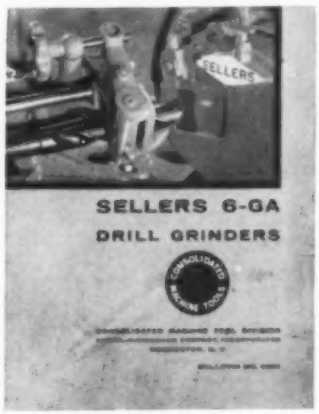
(See Number 5)

ants from water to oil to fortified petroleum bases, then to heavy-duty water-soluble concentrates, and now to chemically conceived coolants containing no petroleum. Hocut 237 is the new product being featured for its long life, freedom from rancidity, rust protection and lubricity. It is reported not to depend on oil for its lubricity nor on sulphur or chlorine for load-carrying ability. A vast proportion of all metal cutting jobs, mixed with various proportions of water for machining and grinding, can be handled. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

9. Sheet Polishing Mills, 30" to 74" capacity, are illustrated and described with diagrams and specifications. The rugged, massive machines utilize machine tool-type construction for smooth, continuous, precision operation, to provide for heavy stock removal. Surface finishes are reported to be produced to exacting specifications. Sheets 3' long and up can be handled on the mills at adjustable feeds from 20' to 60' per minute. When stock removal on sizing operations is within 0.010", a thickness tolerance of plus or minus 0.001" on the finished sheet is said to be consistently produced with a sufficient number of passes on the mills. Flat sheet finishing machines are illustrated also. Acme Manufacturing Co., 1400 E. 9 Mile Rd., Detroit 20 (Ferndale), Mich.

10. Drill Grinder, Sellers 6-GA, is described in Bulletin 4201. Important features of the grinder are pointed out on the illustrations. Standard equipment includes one 10" diameter grinding wheel for high speed drills; coolant system, including filter; all motors and control; standard chuck jaw ends for holding two and four lip drills from 5/16" to 3" diameter, and hand wheel. The machine head can be adjusted to the plane of the wheel to grind points with included angles ranging from 60° to 160°. Specifications include special 2 hp wheel head motor, 1800 rpm; floor space, 3'4"x5'3"; height, 5'; weight, 1100 lbs. Consolidated Machine Tool Div., Farrel-Birmingham Co., Inc., Rochester, N.Y.

11. Cemented Diamond Particles ("with a million points") are described in folder available as being composed of uniformly distributed diamond particles securely held in position by means of a newly developed Koebelite powdered metal matrix. The literature states that CDP wheel dressing tools have proved superior in many applications. Special CDP tools are "engineered" to the job. Solid and cored drills for glass and ceramics—small wheels for finish grinding on hardened steel and carbides—these and many other CDP applications are now in advanced stages of test and development. Koebel Diamond Tool Co., 9456 Grinnell, Detroit 13, Mich.



(See Number 10)

12. Russian Technical Monthly. An English translation of one of Russia's leading technical journals is now being published monthly in Britain. Britain's Production Engineering Research Association (PERA), which is supported by the British Department of Scientific and Industrial Research, is making cover-to-cover translations of "Stanki i Instrument," under the title of "Machines and Tooling." The first English version of the magazine came out in January, 1959. The task has been undertaken to enable engineers to study the developments taking place within Russia in production techniques and equipment. Research and development over a wide field of production as well as improvements in equipment and methods based on operating experiences are covered. British Information Services, 45 Rockefeller Plaza, New York 20, N.Y.

13. Flotation Systems for Clarification of Water Soluble Oil Coolants, in metal working operations, are described in Bulletin FB-102. By achieving continuous, fully automatic clarification of water soluble oil coolants, the units are said to increase productivity of machine tools completely, end down time due to failure of coolant supply and the need for sump cleaning. Clarification of liquids is obtained mechanically without screens, filter-aid powders or disposable media such as cloths, bags or papers. Standard flotation units are available for flow rates from 50 to 1500 gpm. Illustrations and diagram cover the value of the units. Specifications are included also. U.S. Hoffman Machinery Corp., Industrial Filtration Div., Thompson Road Plant No. 1, Syracuse, N.Y.

14. "Optical Products" is a 24-page illustrated index which lists current Bausch & Lomb catalogs. Included are such items as safety glasses, optical gages, magnifiers, and projectors. This Catalog L-86 is

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Hackensack, New Jersey
Tel.: Hubbard 7-3212

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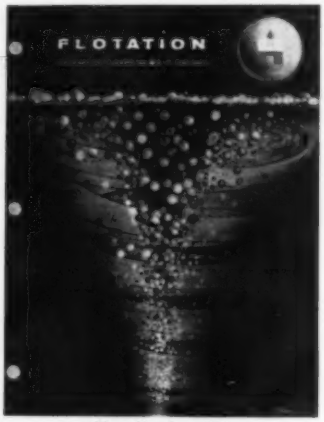
FREE LITERATURE *continued*

divided into consumer, ophthalmic and scientific and technical products classifications, corresponding to the major product divisions of the company. This permits catalogs of allied products to be grouped together for quick, easy reference. Each catalog entry includes a cover illustration and brief descriptive data. A factual account of the contents is included and each catalog number is specified. Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N.Y.

15. Grinding and Buffing Machinery. Catalog 59 contains descriptive information, illustrations and specifications on pedestal grinders, snagging grinders, disc grinders, lathe grinders, carbide tool grinders, buffing and polishing lathes, dust collectors, abrasive cut-off machines, speed lathes and special machinery components for grinding, polishing, milling, drilling, and boring. The Cincinnati Electrical Tool Co., 375 Mt. Hope Ave., Cincinnati 4, Ohio.



(See Number 13)

16. Precision Tool Grinding and Lapping Machine. A brochure is now available on the Agathon tool grinding and lapping machines especially designed for grinding and lapping carbide turning tools for Swiss type automatics, turret automatics, copy lathes and precision toolroom lathes. The literature graphically illustrates how the double-sided wheels are used (one for grinding and the other for lapping) so as to enable the tools to be ground against the cutting edge. Specifications are included also. Carl Hirschmann Co., Inc., 30 Park Ave., Manhasset, N.Y.

17. Heavy Duty Centerless Grinder. The Van Norman 2C Diversimatic, weighing over six tons, offers a work capacity of 0" to 4¾" diameter. As described in brochure, it offers the work-ability of three centerless grinders with a minimum of changeover time for throughfeed work, for infeed work, and can be equipped with a crush forming attachment for profile work. Some of the features are unit type constructed grinding and regulating wheel spindles, a 24" grinding wheel (giving more pieces per dress), and infinitely variable regulating wheel speeds. Illustrations cover the grinding wheel spindle, base construction, wheel motor mount, regulating wheel controls, wheel dressers, and 24" grinding wheel. Accessories for the grinder are listed also. Van Norman Machine Co., Springfield 7, Mass.

18. Air Jet Hand Grinder, as described in four-page circular, offers a speed of 75,000 rpm. This Model 101, weighing 16 oz., features a convenient pushbutton stop brake and new speed regulator for rotary files and burrs. Other important features are discussed. Specifications include 70 to 100 lbs. air pressure; maximum wheel diameter, 0" to ⅞", and chuck opening, ⅛". M-F Engineering Co., 13828 So. Western Ave., Blue Island, Ill.

19. Polishing and Buffing Machines. Folder available illustrates five polishing and buffing machines, a conveyor for the No. 2 heads, and the No. 2 polishing and buffing heads, including applications and capacities for each. Any number of heads and any length of conveyor may be supplied to the customer's specifications. Polishing and buffing machines covered are the reciprocating or continuous operating straight line type; continuous or reciprocating over and under type; standard straight line type; continuous straight line type, which also polishes stainless and cold rolled steel, as well as the materials covered by the other machines, such as aluminum extrusions, stampings and mouldings; and a continuous rotary type machine with rotary table furnished in any diameter with any number of heads. Wilson Buffing Chuck & Machine Co., 22730 Dequindre, Warren, Mich.

(See Number 15)

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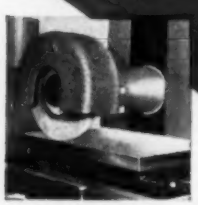
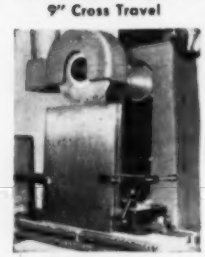
lowest price SURFACE GRINDER

for its class



9" Cross Travel



Greater capacity for high work

MODEL LG 812—9"x12" Wet or Dry, Hand or Hydraulic feed. Bench or Cabinet model.

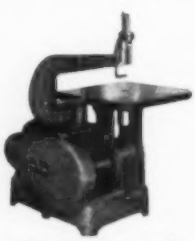
MADE BY THE MAKERS OF THE FAMOUS BUTTERFLY FILING MACHINE

Butterfly

PRECISION SURFACE GRINDER

Avoids tie-up of larger machines—does small jobs faster—saves labor costs—longer cross travel 9"—greater working height under 7" wheel—11½".

The largest capacity of any small competitive grinder in the same price class. Also small size surface grinder 4"x8" for instrument makers.



Butterfly, smooth running, precision filing and sawing machine. Eliminates costly hand filing, sawing and lapping on dies gauges, tools.

Write for description, specifications and prices.

HARVEY MANUFACTURING CORP.

ESTABLISHED 1916

Subsidiary of GERMANOW-SIMON MACHINE CO., Inc., 100 St. Paul Street, Rochester 3, N. Y.

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Grinding and Finishing

APRIL, 1959

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Grinding and Finishing

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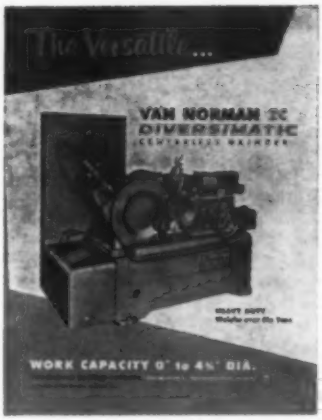


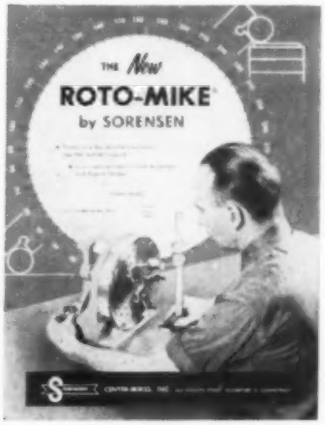
(See Number 17)

20. Fluid Filtration Cart. Bulletin No. 1381 describes a 2-5 micron fluid filtration cart. Illustrated and discussed is the new completely self-contained portable Model 9545 filtration system which is designed for use in precision hydro-mechanical circuits on missiles, aircraft and other hydraulically operated devices. George L. Nankervis Co., 15400 Fullerton, Detroit 27, Mich.

21. Selector Chart for Barrel Finishing Compounds. The Chempound Selector Chart, said to be the first such guide to application of barrel finishing compounds to be published in the industry, is designed to speed and simplify the ordering of barrel finishing compounds, by pinpointing the Chempound which is recommended for any given process on a wide variety of materials. Through a simple three-step process of elimination, the range of Techline Chempounds can be reduced to one that is best suited to the precision barrel finishing operation at hand. Techline Div., Wheelabrator Corp., 1169 Avenue V, Vicksburg, Mich.

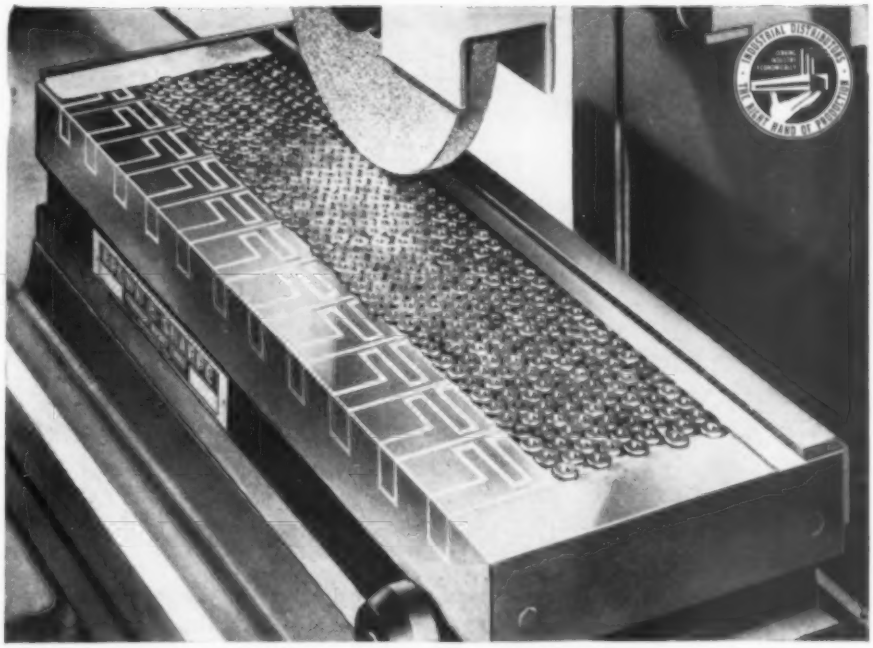
22. Rotary Inspection Instrument. The Roto-Mike, as described in folder, features a fast-setting angle vernier designed for high speed with top-notch accuracy. Illustrations show the four easy steps to setting up. Then the instrument is ready for use, with the sine-ring providing precision. Each of the Roto-Mike's critical dimensions is within .0002" of being perfect, it is reported. The manufacturer's hand hole location gage, bench hole location gage, and collet-square are also illustrated and described. Sorensen Center-Mikes, Inc., 264 Kossuth St., Bridgeport 8, Conn.

23. Jig Borer, Jig Grinder, Measuring Machine. Three new machines, the No. 3



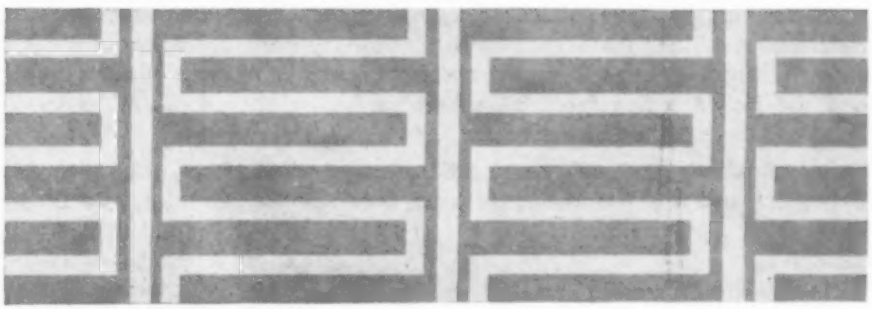
(See Number 22)

BROWN & SHARPE'S NEW FINE MESH CHUCK



New 6" x 18" B&S No. 618-3 Permanent Magnet Chuck holds about 400 parts measuring only ⅜" in diameter on surface grinder.

See why it holds very small parts or thin strips... best!



Actual size of pole-spacing pattern

Notice the close pole spacing on this new chuck's top plate. It's the closest spacing (finest mesh) on the market! You can see that it will hold smaller parts, tighter, anywhere they're placed. And it holds long, thin strips flat, without "waves".

You get greater *accuracy* with Brown & Sharpe's new Fine Mesh Chuck, too, because of the extra-thick, laminated top plate that doesn't deflect when the chuck is turned ON. And it *lasts longer* because the plate can be dressed down a full ½".

Ask your Brown & Sharpe distributor to show how this and other stronger-holding B&S chucks can help you. Brown & Sharpe Mfg. Co., Providence 1, R. I.

Brown & Sharpe

PROGRESS IN PRECISION FOR OVER 125 YEARS

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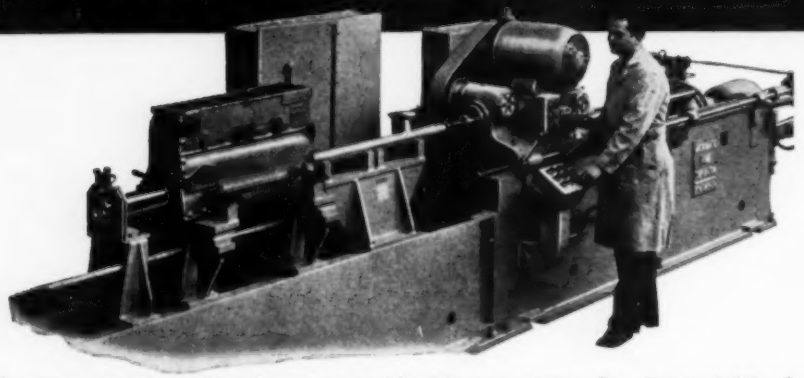
WHY CUMMINS main bearings are MICROHONED

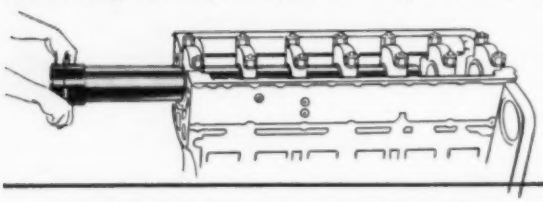


"Cummins diesel engines have a world-wide reputation for dependable, low-cost power. Here at Cummins, we attribute the wide acceptance of our engines to constant searching for better processing methods and improved engine performance.

"For example, if our crankshaft main bearings were undercut at the ends, tapered or out-of-round, then the full load of the journals would be borne by relatively small areas. This would cause bearing inserts to overheat and quickly break down. Also, should the bearings be misaligned, the crankshaft would flex during rotation and cause fatigue failure.

"However, by Microhoning our main bearings we secure *round, accurately-sized* and *aligned bores.* Cummins is the first diesel manufacturer to Microhone its main bearings. The surfaces of Microhoned bearings are clean-cut, free of deformed metal and the finish is consistent in every bore. In addition, the consistent accuracy generated by Microhoning permits us to make faster set-ups and use higher cutting feeds on preceding boring operations—Microhoning automatically corrects all inaccuracies.

"After Microhoning, all main bearing bores are checked with a gage plug 44 inches long and .0007 inch under required bore size. Gage must have a simultaneous slip-fit through all bores in the block. Tolerance for roundness is less than .0002 inch and finish is held to the specified 55 microinches."



Learn how Microhoning will give you efficient stock removal, closer tolerances, accurate alignment and functional surfaces.

☐ Please have a Micromatic Field Engineer call.
☐ Please send Micromatic literature and case histories.

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FREE LITERATURE *continued*

Moore precision jig borer, No. 3 Moore precision jig grinder, and the Moore universal measuring machine—all designed for accuracy to the split-tenths—are introduced in a new two-color brochure. The accuracy of positioning and the operating features of each of the machines are described in detail. Five technicians independently gaged the accuracy of locating four holes in a steel plate that were bored on the jig borer, then ground on the jig grinder, and checked on the measuring machine. The results showed a maximum difference in measurements of 30 millionths. Moore Special Tool Co. Inc., 800 Union Ave., Bridgeport 7, Conn.

24. Coated Abrasive Discs. A four-page illustrated price list describes the manufacturer's Magnecoated abrasive discs. "Giant Brand" discs are used for standard, general industrial, sheet metal, soft or semi-soft metals, ceramics, glass and wood, and special applications. Information is given on the Magnecoating process, as well as size, grit and pricing data on the company's products. Abrasive Co. of America, Ft. Lee, N.J.

25. Self-Contained Filtration and Pump Unit, as described in flyer, is equipped with large-area (850 sq. in., each side) easily-changed, disposable paper filters. Filtration efficiency in the order of five microns is reported possible as the liquid is not forced through the filter media. Standard equipment includes heavy-duty centrifugal pump and filter unit having coolant flow capacity through filter of ten gpm water or five gpm oil. Electroforce, Inc., Fairfield, Conn.

26. Refrigerated Tumbling Machines. Form A-26-S demonstrates how using liquid CO_2 as the refrigerant, new tumbling machines enable precision, production-line barrel finishing of moulded rubber parts of most any size or shape to meet rigid manufacturing requirements. Specifications cover eight models, in sizes ranging from 3.7 cu. ft. to 30.7 cu. ft., with 10-30 rpm speed range. All models have controls for temperatures down to —100°F. "Before and After" illustrations show the value of the Almco LCO_2 method. Almco, Queen Products Div., King-Seeley Corp., Albert Lea, Minn.

(See Number 23)

27. Buffing and Polishing Compounds. 20-page Bulletin No. Co-104 describes the company's more than 150 buffing and polishing compounds and their applications. The bulletin presents a selection from the combined lines of Hanson-Van Winkle-Munning Co. and its J. C. Miller Division. Compounds for buffing and polishing chromium, steel and stainless steel, hard rubber and plastic are described. Liquimatic application equipment and compounds are featured and tripolis and lime for non-ferrous metals are discussed and illustrated. Hanson-Van Winkle-Munning Co., Church St., Matawan, N.J.

28. Contract Manufacturing Facilities. Bulletin available describes the Taft-Peirce's Contract Service Division as an integrated engineering, toolmaking and manufacturing organization which is available to companies desiring to add to existing plant facilities without incurring heavy capital expenditures. Detailed description covers this scope of activity, including such services as individual design, toolmaking, machining, heat treating, production, assembly, and inspection. All of the contract manufacturing facilities available at Taft-Peirce are listed and some of the specific projects which have been successfully completed are highlighted. Taft-Peirce Mfg. Co., Woonsocket, R.I.

Book Review

A shot peening textbook, in a sixth edition, has been revised to include the latest information obtained in research, development and practical applications.

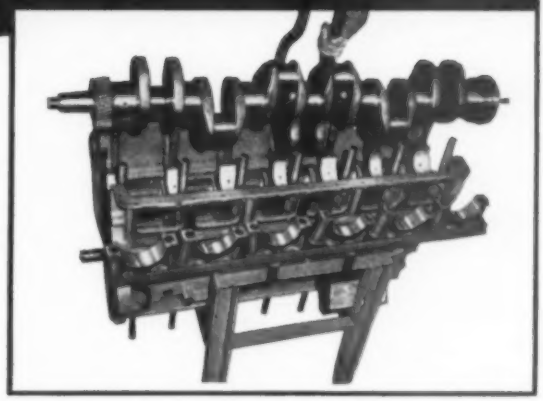
The book contains approximately 200 pages of printed and illustrative material. The latter includes photographs, drawings, diagrams, charts and graphs. The first part of the book is devoted to applications and advantages of shot peening and the equipment and procedures involved. The theory of prestressed surfaces in relation to shot peening and reviews of the history of surface compression methods and their relation to fatigue are covered in the second part.

Priced at $2.50, the book is available from Wheelabrator Corp., 1169 S. Byrkit St., Mishawaka, Ind.

"I know I said flood the work area with coolant, but..."

HOW MICROHONING generates round, accurate, aligned bearing bores

All types of cylindrical surfaces, including small diameters and combinations of soft and hard metals . . . interrupted by keyways, undercuts, ports, reliefs or cross holes . . . can be economically Microhoned to precision tolerances and alignment.

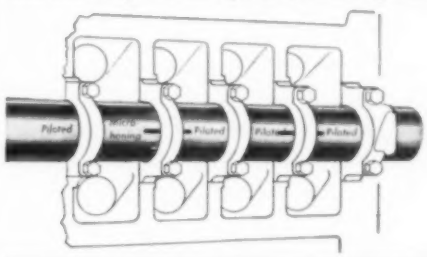


A typical example of Microhoning interrupted cylindrical surfaces is the Cummins Diesel Engine application. Here's how Microhoning generates accuracy and alignment in the crankshaft main bearing bores:

1. Cutting pressure is applied radially from the center of the Microhoning tool body. Abrasives and guides both are expanded by the same feed force, and wear at the same rate.

2. Abrading action is divorced from the effects of spindle or driveshaft vibration and misalignment by a universal joint that is between tool body and driveshaft.

3. The single bank of abrasives travels through all bores on every stroke. As abrasives are Microhoning one bore, the tool is piloted by the plastic guides in the other bores.



The principles and applications of Microhoning are thoroughly explained in a 16mm, 30-minute sound movie, "Progress in Precision". We'll be glad to reserve a print for your use.

☐ Please send me "Progress in Precision" in time for showing on _____ (date).

☐ Please send Microhoning literature; I am interested in the following application _____

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(PATENT APPLIED FOR)

NEW

MANHATTAN SAFETY BACK FLARED CUP

Not simply a new safety "feature" . . . not merely a design "improvement." Here's a *totally new concept* of flared cup wheel design *and* construction . . . developed by Manhattan engineers to give the greatest safety and performance advantages possible for flared cup wheel users. Manhattan's revolutionary SAFETY BACK Flared Cup puts portable wheel *safety* where it counts the most—in *original* strength and breakage resistance!

SAFETY BACK far surpasses such safety features as anchor bushings, safety rings, special hub mountings, or ordinary revolving cup guards. With SAFETY BACK, steel covers the *entire* back of the flared cup . . . extends down the side to offer a degree of reinforcement and breakage resistance never before possible!

NO OTHER WHEEL—AT ANY PRICE—OFFERS THESE EXCLUSIVE FEATURES

- **Greatest Initial Strength**
- **Highest Safety Factor**
- **Easy Mounting—Easy Operation**
- **Improved Mounting Base**
- **One Piece Assembly**
- **Requires No Adjustment**

Only SAFETY BACK gives you these features—*plus* Manhattan's custom-engineered abrasive bond for *faster* removal of *more* metal on your particular job—at no additional cost! For "More Use per Dollar" in portable grinding operations, you can't get a faster cutting, longer lasting—*safer* wheel than MANHATTAN.

Let a Manhattan abrasive wheel engineer show you the advantages of SAFETY BACK Flared Cups, and other types of Manhattan high speed, heavy duty abrasive wheels. Write for Bulletin 7157.

RM-752R1.

GRINDING WHEEL INSTITUTE MEMBER

WRITE TO THE ABRASIVE WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RM

RAYBESTOS-MANHATTAN, INC.

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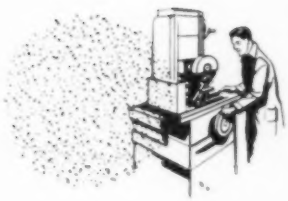


Equipment and Materials

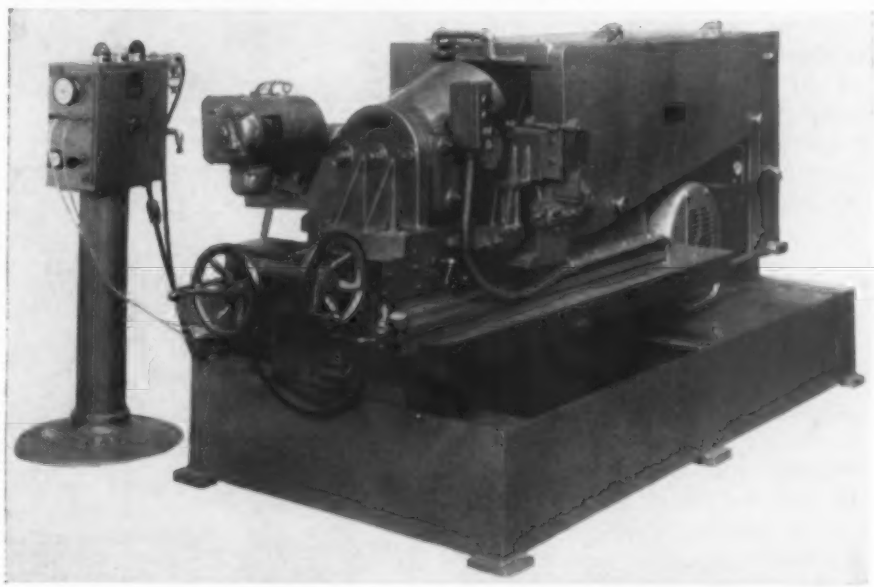
NEW LINE OF CENTERLESS ABRASIVE BELT GRINDERS

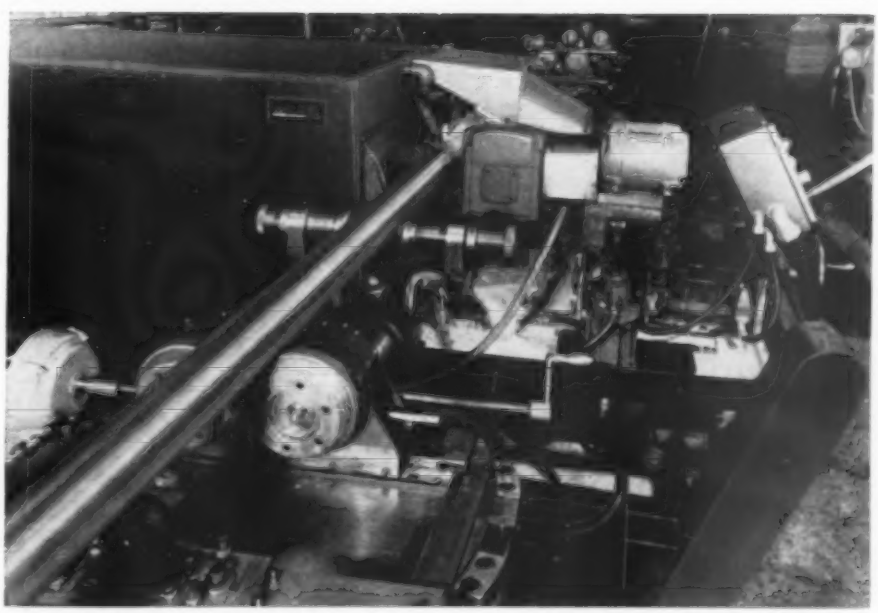
These new Engelberg Model No. 8132 centerless abrasive belt grinders are designed for high-speed precision grinding and finishing of rod or tube stock at through feed rates of from 4" to 40' per minute. A major feature of this wet-or-dry belt model is its large work capacity: it will accommodate stock from ½" to 7" in diameter up to 30' in length.

Both models permit exceptionally heavy single-pass stock removal, quality finishes, and extreme tolerances on ferrous and non-ferrous metals as well as other materials. Depending on application, the No. 8132 can be equipped with an automatic air-electric gaging device and automatic infeed controls for extremely accurate size control. In long-bar applications, up to 30' in length, the No. 8132 can be fitted with idler long-bar outboard supports and a reversing feed mechanism to permit through feed passes in either direction with no intermediate material handling.

The abrasive belt size of Model No. 8132 is 8" x 132", with belt speed of 4500 sfpm. Machine is equipped with air-belt tensioning, a 25 H.P. belt drive unit with all electric controls, and a complete recirculating system of 200 gallon capacity with ½ H.P. coolant pump. Regulating wheel is 13" diameter, 8" wide, and is powered by a ½ H.P. variable speed motor. The heavy-duty model is similarly equipped, except that it has a 50 H.P. belt drive unit.

The powered outboard support mechanism of Model No. 8132-HD vastly widens the range of work capable of being processed by centerless belt grinders. The outboard support mechanism consists of a main power unit utilizing a 7½ H.P. variable speed motor to drive an AC generator and seven 60 cycle one H.P. maximum output "slave" drive units which power the regulating wheel and power feed stands. The power unit generates adjustable frequency AC power which is fed to all the "slave" drive units. As the frequency generated by the power





The Engelberg Model No. 8132 centerless abrasive belt grinder is shown in the top photo, with Model 8132-HD illustrated in the one below.

unit is adjusted, the "slave" motors change speed together. The frequency generated by the variable speed power unit determines the speed of the "slave" units. The number of outboard support stands is variable, depending on size and weight of material processed.

In a typical grinding sequence, for example, tube or rod stock is loaded on to the outboard supports and is automatically presented to the abrasive belt for grinding by the powered supports working in conjunction with the regulating wheel. When the grinding cycle is complete the through-feed motion of the part trips a micro-switch control which may be stationed at any point along the outboard supports to accommodate various lengths and automatically changes the helix angle of the outboard support power units as well as the regulating wheel to reverse the direction of the feed.

Depending on application, the manufacturer reports stock removal rates as high as three lbs. of metal per minute. In the processing of 416 stainless steel bars, 5.060" diameter, 10' in length, the No. 8132-HD removes .018" stock per pass at a feed rate of 70" per minute—a total stock removal of approximately three lbs. of metal per minute. In another application, 1020 steel tubes, 6¾" diameter, 10' in length, are ground removing .015" per pass at a feed rate of 3' per minute for a total stock removal of 1.9 lbs. of metal per minute. On 1015 steel tubes, 3⅜" diameter, 5' in length, .020" stock is removed per pass at a feed rate of 4' per minute for a total of 1.43 lbs. per minute.

Engelberg, Inc., 831 W. Fayette St., Syracuse 4, N.Y.

Use postpaid card. Circle No. 29

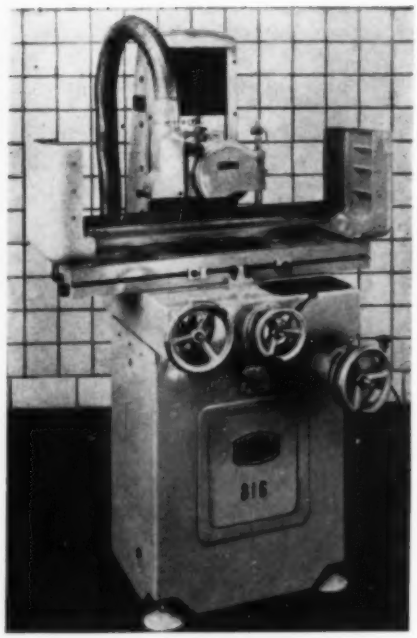
Hand Operated Surface Grinder Has 8" x 16" Table Surface

This hand-operated model 816 Blohm high precision hydraulic surface grinder features high precision ball bearing assemblies running in hardened, ground and lapped replaceable steel ways for the longitudinal and cross movements of table and carriage.

Capacities of the grinder are an 8" x 16" table surface and 16" under the spindle.

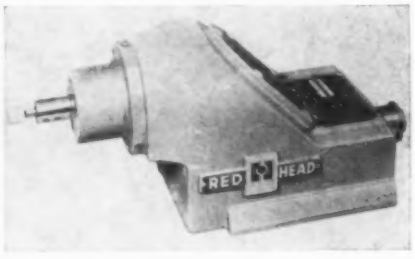
Hermes Machine Tool Co., Inc., 48-15 Northern Blvd., Long Island City 1, N.Y.

Use postpaid card. Circle No. 30

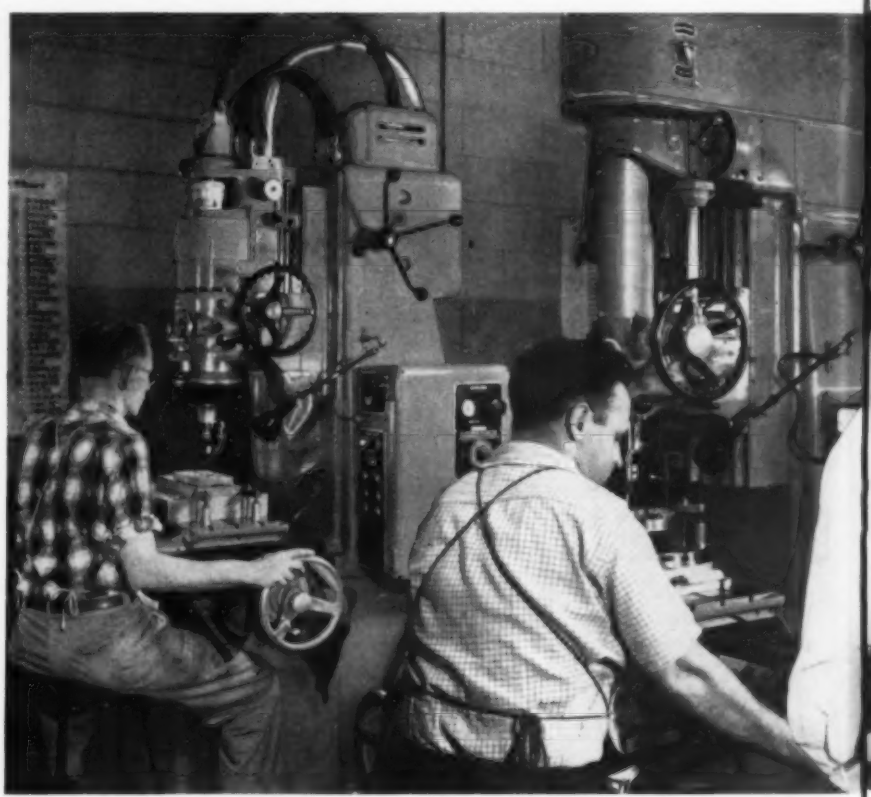


Belt-Driven Wheelheads Generate Spindle Speeds to 100,000 RPM

Grinding small holes at precise sur-



face speeds without expensive high frequency generating equipment is now possible with belt-driven wheelheads. These new interchangeable cartridge type Heald wheelheads develop spindle speeds of 45,000 to 100,000 rpm for grinding small diameter holes where surface speed of the grinding wheel is



"We're now splitting tenths, thanks to Moore's new N

say Karl Harig, chairman, and Herbert Harig, president of **Harig Manufacturing Corporation,** *Chicago*

"Our operators feel these are the best machines they have ever worked on...

"Moore's No. 3 Jig Borer and No. 3 Jig Grinder take care of the tenth-splitting tolerances required by industry today..."

These are the words of two of Amer ica's acknowledged tooling leaders active heads of one of the country's foremost independent producers of ac curate dies—carbide, lamination, pro gressive, and other precision tooling.

Says President Herb Harig, former president of National Tool & Die Man ufacturers Association:

"Moore's line of Jig Borers and Jig Grinders has been an integral part of the development and success of our company from 15 employees in 1937 to 120 today. We have always been

among th model. Th first with Jig Borer "As evi we consid years we Boring an to 15 mac Sums u "When its money after thor selection.

MOORE TOOLS **manufactured b** MOOR

critical. Small shops now can precision grind certain types of small work where close size control, finish and wheel life are important.

Two interchangeable spindle cartridges are available—one operates at speeds of 45,000, 52,000 and 60,000 rpm, the other at 70,000, 85,000 and 100,000 rpm. The three separate speeds for each cartridge are obtained by pulley change. Both cartridges have spindles arranged to accommodate mounted point wheels. Where frequent setup changeovers are necessary, this interchangeability of cartridge is of value.

The Heald Machine Co., 6 New Bond St., Worcester 6, Mass.

Use postpaid card. Circle No. 31

6" Abrasive Belt Grinder Has Precise Water Control

The Hammond Model 600-P abrasive belt grinder, as a dry model, is equipped with an exhaust outlet. Also, this model can be equipped at extra cost with a built-in DusKolector.

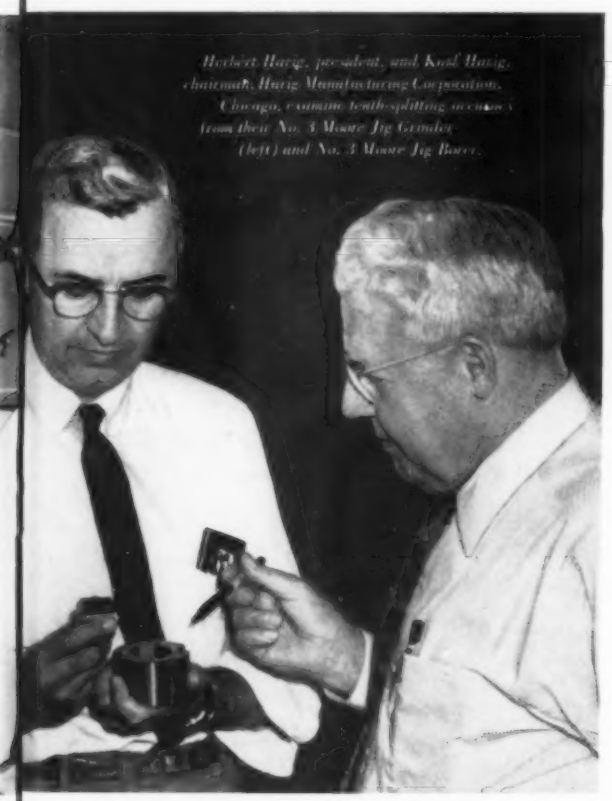
As a wet model (illustrated), the 600-P has a new style sprayer which provides a heavy layer of water on the belt and complete flooding of the work. The sprayer is adjustable to the work height. A curtain attached to the sprayer traps splash from the work and table. Work temperature is kept at a minimum. A modern hood and large pan provides very effective spray and splash control. Thus the operator and floor are kept dry.

Belt tracking is outside the hood away from water and grit. The door is recessed for right angle work. A handy lever releases the spring belt tension for fast and easy belt changes. Quick change from vertical to horizontal position is made by loosening two screws. The steel platen is reversible top to bottom and front to back for maximum use. The pulleys are dynamically balanced for smooth operation and run on sealed ball bearings. The drive is V-belt.

Specifications include: abrasive belt (belts not furnished), 6" x 48"; abrasive belt speed, 3400 sfpm; platen, 6" x 11½"; work rest, 3" x 8½"; coolant tank capacity, 15 gal.

Hammond Machinery Builders Inc., 1600 Douglas Ave., Kalamazoo, Mich.

Use postpaid card. Circle No. 32


Herbert Harig, president, and Karl Harig, chairman, Harig Manufacturing Corporation, Chicago, examine tenth-splitting accuracy from their No. 3 Moore Jig Grinder (left) and No. 3 Moore Jig Borer.

"ew No. 3 Jig Borer and Jig Grinder"

Made and calibrated to the new international inch.

among the first to install each new model. That's why we are among the first with Moore's tenth-splitting No. 3 Jig Borer and No. 3 Jig Grinder.

"As evidence of how indispensable we consider this equipment, over the years we have enlarged our Moore Jig Boring and Jig Grinding Department to 15 machines!"

Sums up Chairman Karl Harig:

"When owner-management invests its money in machinery, it does so only after thorough analysis and careful selection. I don't know of any machine tool manufacturer which meets both tests better than does Moore."

There's little more we can add, except to say that we stand ready to help you duplicate Harig's record of satisfaction. You can start by asking today for our detailed literature on the new No. 3 machines with their larger tables; hardened, ground and lapped ways; no gibs, no overhang.

Also, our dealer organizations will gladly share with you their extensive knowledge of holes, contours and surfaces (see column at right).

Moore dealers know holes, contours & surfaces

- Machinery Sales Company 2838 Leonis Boulevard Los Angeles 58, **California**
- B-H-S Machinery Company 717 Airport Boulevard South San Francisco, **California**
- Brett Machinery Company 639 Madison Street Oak Park, **Illinois**
- The Cameron & Barkley Co. Machine Tool Division 107 South Franklin Street Tampa, **Florida**
- State Machinery Company, Inc. 1800 North Meridian Street Indianapolis 2, **Indiana**
- Allen Supply Company, Inc. 221 Third Avenue, S.W. Cedar Rapids, **Iowa**
- Ernst-Eichman Machinery Corp. 323 West Murdock Street Wichita, **Kansas**
- Peninsular Machinery Company 19178 James Couzens Highway Detroit 35, **Michigan**
- Ernst-Eichman Machinery Corp. 1701 Locust Kansas City 8, **Missouri**
- William Scheer Company 6376 Clayton Road St. Louis 17, **Missouri**
- Jeffreys Engineering & Equip. Co. P.O. Box 3443—Guilford Bldg. Greensboro, **North Carolina**
- The C. H. Gosiger Machinery Co. 1046 Delta Avenue Cincinnati 8, **Ohio**
- Parks Machinery Company 4040 Mayfield Road Cleveland 21, **Ohio**
- The C. H. Gosiger Machinery Co. Bacon & McDonough Streets Dayton 2, **Ohio**
- Oatis Machinery Company 325 West Central Avenue Toledo 10, **Ohio**
- Martin Machine Tool Company 514-516 South Peoria Tulsa 1, **Oklahoma**
- Hallidie Machinery Company 1545 S.E. Union Avenue Portland 14, **Oregon**
- Wm. K. Stamets Company Jenkins Arcade Building Pittsburgh 22, **Pennsylvania**
- Hamilton Machinery Company P.O. Box 5959, 918 W. Commerce Dallas 22, **Texas**
- Hallidie Machinery Company 210 Hudson Street Seattle 4, **Washington**

CANADA

- The D. T. Lawrie Machinery Co. 98 Traymore Avenue Hamilton, **Ontario**, Canada
- Moore Bros. Machinery Co., Ltd. 953 St. James Street W. Montreal 3, **Quebec**, Canada

MOORE SPECIAL TOOL COMPANY, INC.

Bridgeport 7, Connecticut

"MOORE ACCURACY" FOR THE MISSILE AGE

Use postpaid card. Circle No. 230

Portable Tumble-Finisher Has Lift-Off Removable Barrel

Precision and portability for small parts finishing, deburring and polishing operations are now obtainable with the Model RA Rollabrader. The 0.5 cu. ft.

machine features a barrel drive system using four neoprene rollers and dual drive shafts. Variable speed drive is adjustable from 20 to 46 rpm.

Orange-colored vinyl barrel lining, convenient lifting handles on barrel and machine bed, and heavy-duty welded construction suitable for steel ball burnishing are other advantages of the barrel finisher.

Typical uses include short runs of small production parts, experimental processing, and precision finishing of delicate parts and similar small volume work.

The unit measures 25¼" high x 31" deep x 17½" high, and weighs 102 lbs. Price is $168.50 complete.

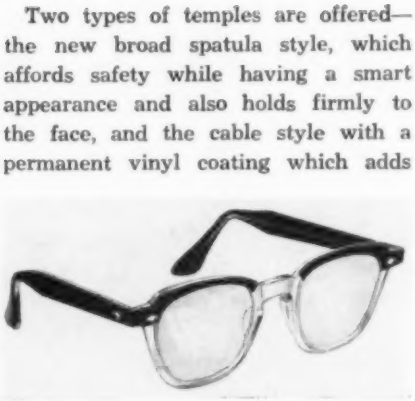
Rampe Manufacturing Co., 14915 Woodworth Ave., Cleveland 10, Ohio.

Use postpaid card. Circle No. 33

Glasses Provide Safety Plus Styling

The Duo-Tone (Series 711) line of plastic frame safety glasses offers safety and good styling.

Two types of temples are offered—the new broad spatula style, which affords safety while having a smart appearance and also holds firmly to the face, and the cable style with a permanent vinyl coating which adds



flexibility without sacrificing strength.

The line also provides the standard S-7 square lens shape, allowing interchangeability with present safety glasses. Both Rx prescription and plano lenses are offered.

Sellstrom Manufacturing Co., Palatine, Ill.

Use postpaid card. Circle No. 34

Coolant for Abrasive Cutting

Campbellene, a cool-blue coolant concentrate, containing the deodorant Odormask, has been developed for use with all makes of abrasive cutting machines and most grinding operations. It is designed primarily for use with Campbell abrasive cutting machines.

This concentrate will not support bacterial growth and cannot turn rancid, it is reported.

Features claimed for the product are keeping abrasive wheels clean and sharp, promoting extremely rapid chip settling, improving cut quality, minimizing odors, and inhibiting rusting of machine and parts.

The product is available in one-gallon cans, cartons of six one-gallon cans, five-gallon pails, 14-gallon quarter-drums and 55-gallon drums.

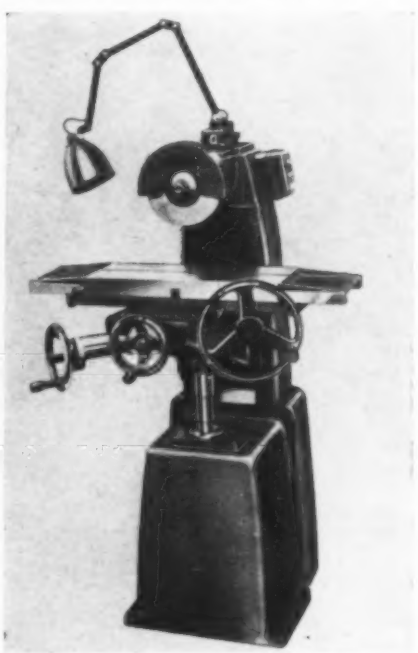
Allison-Campbell Div., American Chain & Cable Co., Inc., Bridgeport 2, Conn.

Use postpaid card. Circle No. 35

Horizontal Surface Grinder Quickly Set and Operated

The Eagle surface grinder is reported to be quickly set and operated and can be used for all surface grinding operations and for jigs, fixtures, press tools, cutters, etc.

Vertical movement of the knee is operated by hand wheel through 2/1 ratio bevels, the movement being marked by .0005" graduations. Sturdily



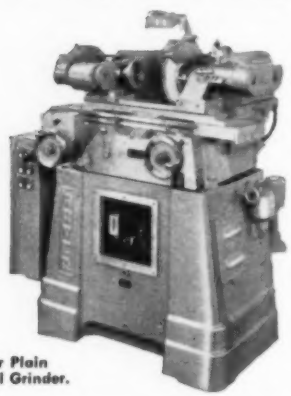
designed saddle is fitted with four oil-wells for constant table lubrication. The table is hand operated by 7" handwheel through helical pinion and rack. The

Best buy for tool room or small capacity production grinding

Here's a real dual-purpose machine that can be arranged for either internal or external grinding simply by changing wheelheads. Relatively low in price, it can handle toolroom as well as the production jobs requiring a small capacity machine.

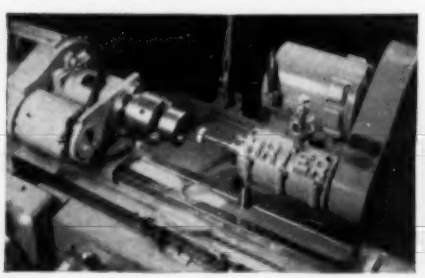
Separate wheelhead units are furnished for internal and external grinding. Thus, the basic machine can be purchased for either type of application and auxiliary equipment added at a later date. Internal wheelhead is bored 3" to take ball-bearing mounted spindle assemblies of 15000 or 32000 rpm. Work-head can be swiveled 90 degrees, has a graduated plate that provides accurate settings up to 30 degrees either side of center.

Standard features include complete hydraulic movement of table and wheel-



Internal or Plain Cylindrical Grinder.

head, centralized push-button controls, and diamond wheeldresser with graduated dial. Maximum feed is .0005", minimum is .0001" at each table reversal. Maximum capacities are: External, 3" O.D.; Internal, 3" I.D.



▲Internal grinding head set up to grind the bore of an arbor support bushing.

▲Workhead is swiveled 90 degrees in grinding face of a gear-shaper cutter.

Write today for details on the Sundstrand-Arter dual-purpose grinder. Bulletin 302.

SUNDSTRAND ARTER

SUNDSTRAND-ARTER Grinders
Division of Sundstrand Machine Tool Co.
ROCKFORD, ILLINOIS, U.S.A.

Use postpaid card. Circle No. 231

table runs in V-slides, adjustable by means of gib. The heavily designed grinding head runs in precision taper roller bearings, providing long and trouble free bearing life without the need for constant attention to lubrication, the manufacturer reports. The motor is housed in the base and drives by V-belt through the column and is therefore totally enclosed.

Specifications include: table size, over-all, 32", effective, 18" x 6"; wheel size, 7"x½"; grinding cap., 15"x6"; feeds: hand operated vertical, 0.0005", horizontal, 0.001"; spindle speed, 2,500 rpm; approx. net weight, 660 lbs.; floor space, 50"x34".

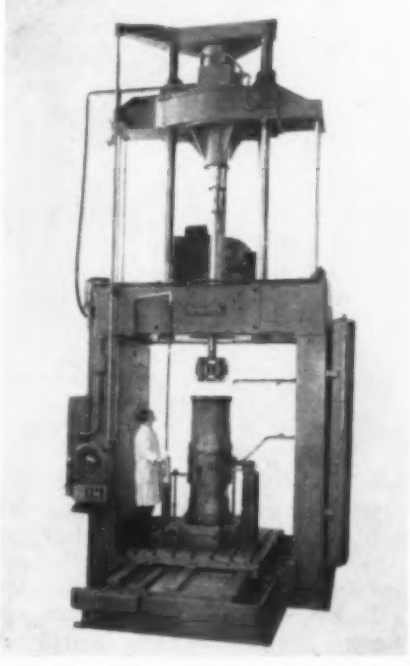
Aaron Machinery Co., Inc., 45 Crosby St., New York 12, N.Y.

Use postpaid card. Circle No. 36

Honing Machine Finishes Giant-Size Cylinder Liners

This extra heavy duty BarnesdriL machine for honing large bearings, cylinders, cylinder liners, marine and diesel parts, and compressor cylinders has just been installed in the plant of a heavy equipment manufacturer. The honing machine provides a capacity range up to 36" diameter and 72" length. It is equipped with a 30 hp motor on the head and 20 hp motor on the hydraulic unit.

Having pneumatic hone expansion and a spindle stroke of 80", the machine is used for honing 14" to 19.5" diameter cast-iron cylinder liners, 70" in length. Stock .010"—.020" is removed and finish of 7 to 32 rms produced.



Model 8530 single spindle vertical honing machine is illustrated.

Barnes Drill Co., Rockford, Ill.

Use postpaid card. Circle No. 37

AIR IN MOTION KEEPS MEN IN MOTION

K & B system serving castings grinding removes dust, sand and chips as fast as they are produced. Work revolves on turntable to enable operator to work continuously.

Dusty or fume-laden air can curtail production and increase maintenance costs by dulling worker efficiency and damaging bearings, motors . . . even machines.

Efficient K & B Dust Control Systems put AIR in Motion to become an important production tool.

In the plant of a noted chain and forging firm, an official made this comment about a new K & B installation: "Our workmen can now work full time . . . this means added production for them and for the company as well."

Call on K & B engineers to put *AIR in Motion* and help boost your plant efficiency. The Kirk & Blum Manufacturing Company, 3124 Forrer Street, Cincinnati 9, Ohio

50 YEARS OF SERVICE

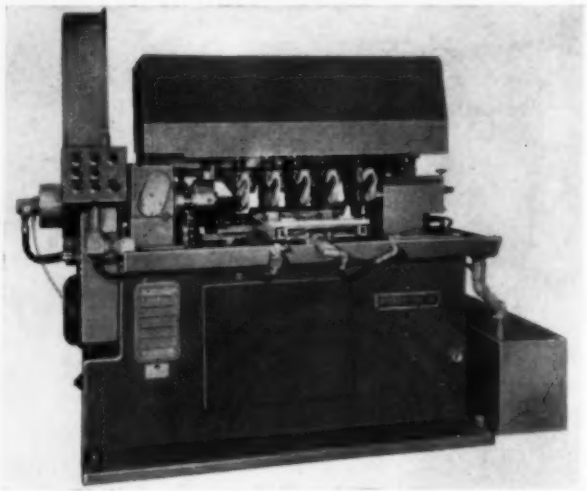
KIRK & BLUM

DUST CONTROL

K & B Down Draft Dust Control System in plant of The Monarch Machine Tool Co., Sidney, Ohio

Use postpaid card. Circle No. 232

Machine Laps or Roll Burnishes Straight Shafts and Camshafts



The Footburt-Schraner Model SFA is a completely automatic machine for lapping or roll burnishing bearing surfaces on straight shafts or camshafts. Equipped with automatic loading and unloading devices, this machine handles shafts up to 36" long and with a maximum outside diameter of 12". Shafts with bearing surfaces ½" wide or more, and with at least 1¾" between centers, can be accommodated. Maximum bearing O.D. with standard lapping heads is 3".

This model can be equipped with an air or hydraulic chuck or the work can be supported between centers. Work supported between centers is usually driven by a drive plate which engages holes or projections on an end flange. One arrangement consists of six spring-loaded pins located in a circle on the face of the drive plate. The work is dropped into the machine without rotary orientation and the pin nearest the driving hole in the end flange of the work engages the hole when the spindle starts to rotate.

Like all Footburt-Schraner lapping machines, the model employs rolls of coated-abrasive cloth as the finishing medium. A five to seven microinch rms finish is obtained on parts which have been finish ground or precision turned to at least a 40 microinch rms finish.

This machine can be equipped with a maximum of five bearing heads and 16 cam-lapping heads. Machines are available with either integral or separate hydraulic units. Floor space required is 66" x 84"; height is 62", and net weight approximately 6,500 lbs.

The Foote-Burt Co., Schraner Div., Cleveland 8, Ohio.

Use postpaid card. Circle No. 38

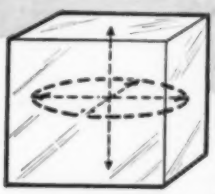
TRAVATROL

Electronic Traverse Control

TRAVATROL is a linear measuring and positioning control, providing accuracy and convenience. Operates from a single phase current supply. A wide range of models available, complete packaged linear positioning control, with variable speed D. C. motor drive, three dimensional position systems available. TRAVATROL systems offer remote control for air, hydraulic or electric valves and tracer systems.

Remote controlled linear travel reduces costly mechanical set-up time and eliminates manual readjustment of the limiting region.

TRAVATROL establishes and maintains a minimum distance of travel allowing point to point positioning over the entire traverse range. Controls for reciprocating members are equipped with dual adjustments for minimum and maximum travel range.



TRAVERSE DIRECTIONS UNLIMITED

...for Reciprocating Machine Beds
Indexing Rotary Tables
Positioning Work Heads

NEUTROFIER

Automatic Electro-Magnetic Chuck Control

A self contained unit operating from an alternating current source, providing full wave direct current combined with extremely versatile magnetic chuck control. Saves operator's time; speeds up production by quick and complete release of work. Provides means of retaining residual magnetism when desired.

Fast cycling and long life are distinct advantages in the NEUTROFIER. Models for every application; single and multiple units available with remote control station or automatic cycling relays.

For Electric Motor Driven Units

also
ELECTRO-MATIC RECTIFIER
NEUTROL
NEUTROLATOR
RESIDUMETER
ELECTRO-MATIC DEMAGNETIZER

ELECTRO-MATIC PRODUCTS CO.
2235-37 N. Knox Ave. • Chicago 39, Illinois

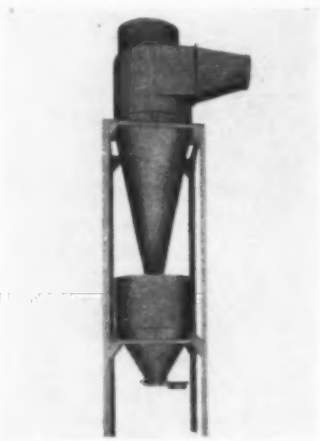
Use postpaid card. Circle No. 233

Adjustable Belt Drive Permits Wide CFM Performances

The large size Model 36 cyclone separator operates in the 4,000 to 6,000-plus cfm range. Other recently-announced models are the No. 24, operating in the 2,000-3,000 cfm range and Model 30, rated from 3,000 to 4,500 cfm.

The Model 36 features adjustable belt drive to give a wide range of cfm performances against varying resistances. Its long tapering cone design and high inlet velocity place it in the "high efficiency" cyclone separator classification.

In the Model 36, the blower is



mounted either on the clean air side of the collector or remotely to prevent fan damage from bulky dust, chips, wood blocks, tramp iron or other foreign substances. These are deposited in the collector base, before air reaches the blower. If the blower is located remotely, it can be used for either blow-through or pull-through operations.

Torit Manufacturing Co., Dept. KP, Walnut & Exchange Sts., St. Paul, Minn.

Use postpaid card. Circle No. 39

Air Jet Hand Grinder Features 75,000 RPM Speed

This Model 101 16-oz. grinder offers a speed of 75,000 rpm for smoother operation. This results in faster work with less wheel wear.

A push button stop brake is said to insure immediate shut-off for safe operation. A positive needle point valve has been installed near the sound muffler. Featured also is a speed regulator for rotary files and burrs.

Specifications include 70 to 100 lbs. air pressure; over-all length of body, 4" OD 2" x 1-⅜"; maximum wheel diameter, 0" to ⅞"; chuck opening, ⅛".

M-F Engineering Co., 13828 So. Western Ave., Blue Island, Ill.

Use postpaid card. Circle No. 40

Chemical Goggles Are Colored For Specific Operation

By coloring the vinyl frame of its Glensite "Softie" chemical goggle yellow, the manufacturer has provided a safety goggle readily identified as to the operation in which it is to be used. The color conforms to the American Standards Association Color Code for acid operations.

Six splash-proof vents provide better air circulation and prevent fogging, even when the goggle is worn over other glasses. A self-adjusting, flexible vinyl noseguard gives wearer maximum splash protection.

The goggle is available in the 350 series with the yellow frame or in the 351 series with a clear frame.

Glendale Optical Co., Valley Stream, Long Island, N.Y.

Use postpaid card. Circle No. 41

HIS JOB ....TO BUILD YOUR PROFITS!

THE *Roto-Finish* CUSTOMER'S MAN

There's nothing unique about stressing product quality. But, at Roto-Finish we have an added incentive. The success of the Roto-Finish Customer's Man *depends* on providing the kind of dependable, mass-production finishing service which builds customer satisfaction, and results in a steady repeat business.

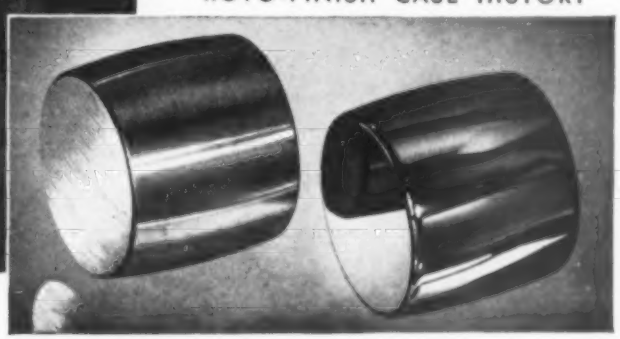
TRIAL AND ERROR FINISHING IS COSTLY

If you're now barrel finishing, our Customer's Man will welcome an opportunity to work with you in your own plant to show you how to get the finish you want, faster, and at lower cost.

If you're hand finishing, he can show you how to save up to 80% of your present finishing costs.

WANT PROOF? Then write or phone your Roto-Finish Customer's Man today.

ROTO-FINISH CASE HISTORY



*This photo is unretouched.

MATERIAL: Bearing steel, 61 Rockwell C Scale.
DIMENSIONS: 1.213" dia. x 1.015".
FINISH BEFORE: Ground to 10 RMS.
FINISH AFTER PROCESSING: 2 to 4 RMS, *(with no dimensional change).*

Roto-Finish COMPANY
3730 Milham Road
KALAMAZOO, MICHIGAN
Phone: FIreside 3-5578

ROTO FINISH

FOREIGN REPRESENTATIVES: ARGENTINA—Taller—Buenos Aires ● AUSTRALIA—A. Flavell Ltd.—Cheltenham ● BRAZIL—Commercial E. Industrial de Fornos Werco, Ltd.—Rio de Janeiro ● CANADA—Canadian Hanson & Van Winkle Co., Ltd.—Toronto ● ENGLAND—Roto-Finish Ltd.—Hemel Hempstead ● FRANCE—Societe Roto-Finish—Paris ● GERMANY, AUSTRIA, NORWAY, SWEDEN, SWITZERLAND—Metallgesellschaft A. G.—Frankfurt, a. M.—Germany ● HOLLAND, BELGIUM, LUXEMBURG—N. V. Roto Finish Maatschappij—Delft, Holland ● ITALY—Societa Roto-Finish a R. L.—Milan ● SPAIN—Instituto Electroquimico, S. A.—Barcelona

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MICRO MILLING STAINLESS TO .001"
WITHOUT SHEET DISTORTION

SUPER-SPEED POWER QUILL

Where all other types of tools and equipment had failed, a PRECISE Super-Speed POWER QUILL—mounted on a standard machine tool—solved an acute milling problem for the Delta Corporation, Hartford, Connecticut. The high speed and precision of a PRECISE Super 60 POWER QUILL easily maintained slot tolerances of .001" on a thin stainless steel jet component without sheet distortion.

PRECISE Super-Speed POWER QUILLS meet every production and toolroom requirement and are quickly mounted with PRECISE mounts on standard and special machine tools. They mill or grind the hardest alloy steel, soft plastic, wood and rubber, aluminum, Masonite and even glass. Their superhigh speeds, high torque, spindle and chuck rigidity permit the use of the hardest cutting tools for faster stock removal, improved surface finishes, maximum tool life, and the maintenance of tolerances to .0001". Adjustable spindle speeds range from 15000 rpm to 45000 rpm with power ratings up to 1½ hp from ordinary 110v or 220v power supplies.

Mail coupon below for complete information on the entire line of PRECISE Super-Speed MICRO TOOLS.

PRECISE PRODUCTS CORPORATION, Racine, Wisconsin, U. S. A.
Branch Plant: Precise, G. m. b. H., Duesseldorf, Germany

Quality and Precision Since 1882

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Power Quills Grinder Millers Milling Machines Accessories
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PRECISE PRODUCTS CORPORATION, 3735 Blue River Road, Racine, Wisconsin
☐ Send complete information on Power Tools ☐ Have salesman call.
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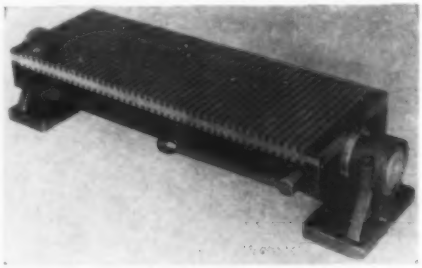
Chucks Have Swivel Bases

Swivel bases are an important new design feature of O.S. Walker permanent magnetic chucks, increasing the usefulness of this holding device for all kinds of flat or angular machining



operations. Chuck and workpiece may now be tilted to 45 degrees right or left of center. Exact position is set directly from an integral graduated dial.

As in other Walker permanent chucks, the new swivel units incorporate ceramic magnets. The bar poles, only ¼" wide, give uniform holding over the entire chuck top. Work-holding ability is excellent, even on very thin parts, the manufacturer reports. Secondary external fields are controlled to prevent magnetism from invading the machine table and ways. In the "off" position, the chuck is completely demagnetized.

The model illustrated has 8" x 24" table face. A complete range of sizes is available to suit customer requirements.

O. S. Walker Co., Inc., Worcester, Mass.

Use postpaid card. Circle No. 42

Flat Threads, Grooved Profiles Ground By Thread Chaser Grinder

The Reishauer BS thread chaser grinding machine is specially designed for grinding all types of flat threads

and grooved profiles such as those found on chaser dies, flat rolling dies and racks. Rigid construction is said to guarantee extremely accurate profiles and excellent surface finish.

The machine operates with multi-

ribbed grinding wheels up to 4" width. Grinding wheel profiling occurs on the machine by means of hydraulically controlled profile crushing. Feed or infeed is performed by horizontal movements of the grinding wheel slide.

The workpiece table is inclined at 30° from the horizontal. A wide limit of worktable speeds are controlled by a variable, hydraulic delivery pump. For setting the required pitch angle in grinding radial chaser dies, the worktable can be swiveled ±6° in either direction. To grind the desired taper in radial dies, the table can also be tilted by ±6° relative to the grinding spindle axis.

A special indexing device on the grinder also makes it possible to grind workpiece surfaces of a regular polygon shape such as broaches to a maximum length of 14".

Specifications include minimum pitch, 32 t.p.i.; maximum pitch, 4 t.p.i.; maximum stroke of table, 16".

Cosa Corp., 405 Lexington Ave., New York 17, N.Y.

Use postpaid card. Circle No. 43

16" Cut-Off Saw

The Model M-750 16" cut-off saw, powered by a full 7½ hp continuous duty, T.E.F.C. motor, is said to assure trouble free cutting of the hardest of metals with the utmost speed and accuracy. The saw cuts ferrous and nonferrous metals at a rate of two to four seconds per square inch to tolerances of less than .010, leaving milled-like finish which often eliminates subsequent operations, the manufacturer claims.

Among the features are a geared-in-head motor to deliver maximum power to spindle with no loss of speed or power due to belt slippage and a self-centering vise that is adjustable for accurate angle cutting up to 46°.

Designed for operator's safety and minimum fatigue, the unit is available for manual, semi-automatic and fully automatic operations.

Stone Machinery Co., Inc., Manlius, N.Y.

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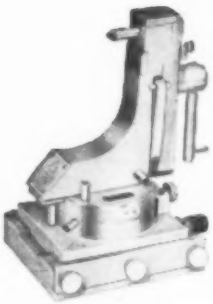
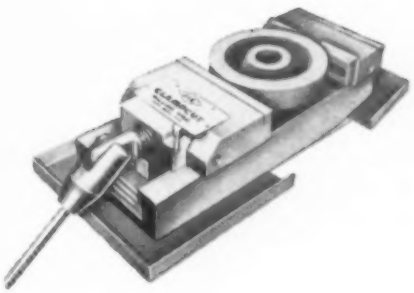
J&S DOWN-HOLDING DEVICES and WHEEL DRESSERS LEAD THE FIELD

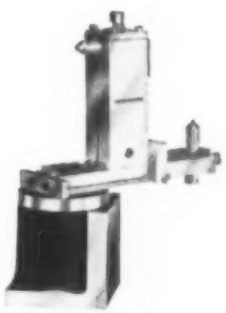


Fluidmotion Wheel Dressers—Dress two angles tangent to a radius, using ONE handle in one continuous motion. Operation is so fast and simple that beginners can use them. For all types cylindrical and surface grinders.



J & S Swivel Vise—The only hardened and ground swivel vise that mounts low, swivels, needs no pedestal. Patented down-holding clamping jaws give many times the holding power of an ordinary vise, yet only half the weight.

J & S All-Purpose Jaw Clamps — For any machine table or face plate. Five models—one adjusting screw has a holding force of 2½ tons on Small model, 12 tons on Jumbo model. Eliminate u-clamps, straps and fingers. No obstruction problems, no interference with measuring tool readings.



J & S Form-Master—Sturdy wheel dresser for shops with less frequent wheel dresser requirements. High quality, 100% dust-proof, it is capable of dressing any radii up to 12" convex, up to 15" concave.

Write for free literature and further information.

J&S TOOL CO. INC. — JAW CLAMPS · PRECISION VISES · DOWN-HOLDING DEVICES — CLAMPCUT

J & S TOOL CO., INC.

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LIVINGSTON, NEW JERSEY

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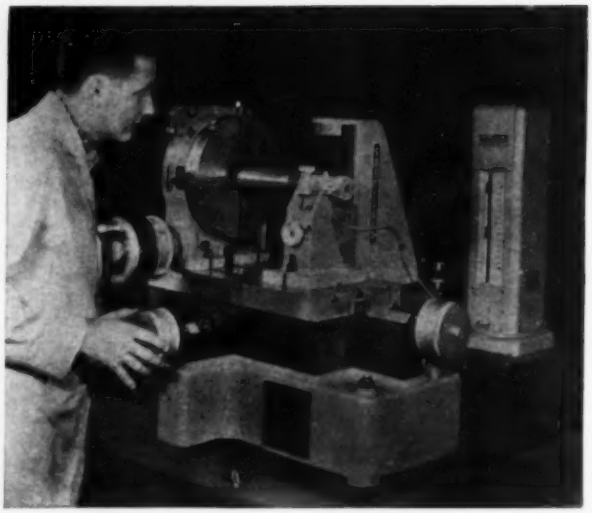
Three Dimension Cam Measuring Machine



A Precisionaire measuring machine, for inspecting the contour of two and three dimension cams, can inspect three dimension cams up to 3" radius and 6" long. The machine uses bench space of 32"x26". Irregular shaped parts requiring precise measurement can be inspected also.

Featured are the high-amplification Precisionaire fiducial indicator for locating cam datum points precisely, the 4" barrel micrometers accurate to .000010 (ten millionths) for setting radial and axial movements, and an ultra-precise rotary table to establish the angular coordinate of the cam.

Radial and axial movements are reported to be made to an accuracy of .00001 and angular position to within plus or minus 6 seconds of arc throughout the entire 360°.

The Sheffield Corp., Dayton 1, Ohio.

Use postpaid card. Circle No. 45

Closing Device Permits Quick Change of Filter Elements

A new line of Quick-Top hydraulic filters features a closure device that

A screwdriver, a flip of the wrist, and the top is off the Quick-Top hydraulic filter.

permits filter elements to be changed in less than a minute. The closure consists of a hand removable cover which is held in place by a spring steel retainer ring.

For use with hydraulic oils, fuels, solvents, lubricating oils and other fluids, the filters have been designed to use standard AN-6236 elements which are readily available. Special elements of sintered materials, mesh or cellulose can be supplied where necessary.

Units rated for flow of 15, 30, 60, or 90 gallons a minute at temperatures from —65° to 200° F are available in each of three series. Series 600 is for use with systems having maximum pressures of 250 lbs. a square inch; Series 650, for 1,000 psi, and Series 700, for 5,000 psi.

Test Equipment Div., Consolidated Diesel Electric Corp., 1 John St., Stamford, Conn.

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One Man Can Operate More Than One Cutter Grinder

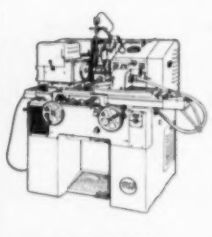
The Ingersoll automatic cutter grinder will do a complete sharpening job on a

MSO SOLVES Grinding Problems

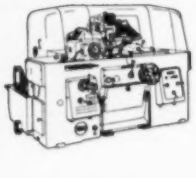
Since 1865

This is the 94th consecutive year of MSO leadership in the development of improved grinding methods.
MSO offers unequalled precision in the most advanced grinding machines available anywhere.
Today, when your grinding problems are more complex than ever before, MSO, as always is one step ahead with the solution.

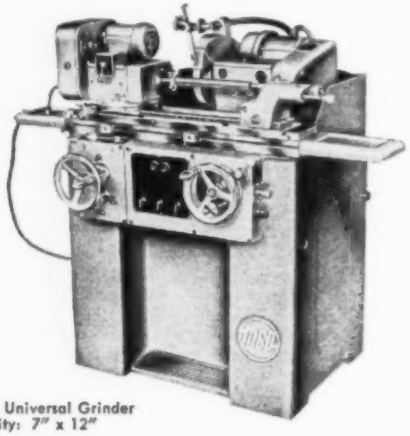
The MSO line comprises a full range of Plain and Universal Grinders, Cap. 7" x 12" to 22" x 138".



MODEL FH-200 HYDRAULIC PRODUCTION GRINDER



MODEL GA-2 HYDRAULIC THREAD GRINDER



Mod. FMES Universal Grinder Capacity: 7" x 12"

FEATURES:
- Compound Swivelling Wheelhead
- Manual and automatic feed to wheelhead
- Fine feed to .00005"
- Manual and automatic table traverse
- Hinged Internal Grinding Attachment
- Patented adjustable MSO spindle bearings

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AUS-38a

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wide range of milling cutters since it will grind on the OD as well as the face and bevel of any cutter within its 4" to 20" diameter capacity. One man is able to operate more than one of the grinders, with mechanical control of the grinding action providing better grinds.

The grinder spin-grinds newly filled cutters to size. A dust collection system is built into the machine to provide dirt protection for moving parts. As the grinding wheel wears, the spindle speed automatically increases so that constant surface speed is maintained. The wheel is automatically dressed with every stroke.

The machine was developed specifically for grinding a variety of inserted blade carbide cutters used in general purpose, job shop milling. Setups are easily and rapidly changed from one size and type of cutter to another.

The Ingersoll Milling Machine Co., Rockford, Ill.

Use postpaid card. Circle No. 47

Depth Gage Includes Versatile Mounting Collet

A new series of Pet-line depth gages includes a versatile spring collet that can also be used separately for mounting dial indicators. These depth gages are available in two or three-hole models to check center or off-set depths. They are said to provide a fast, convenient means of checking depths of holes, recesses, slots and other depressions.

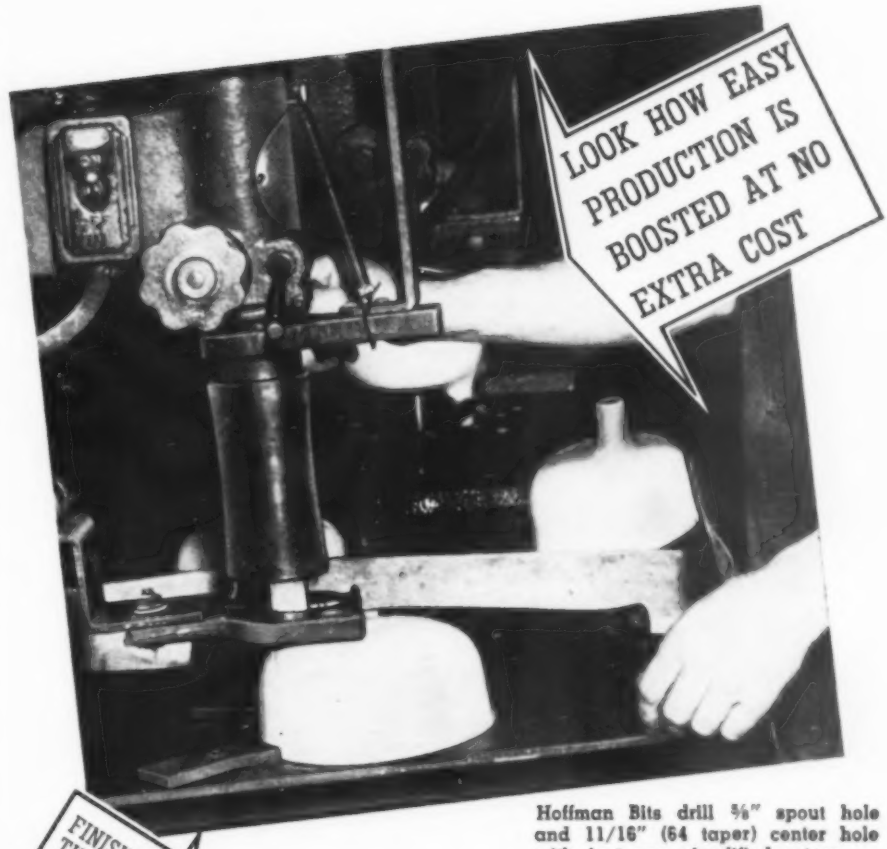
Each depth gage includes a special 3/8" spring collet that will accommodate any A.G.D. dial indicator. These spring collets are also supplied individually. Used in this manner, they are reported as ideal for mounting dial indicators on fixture gages and plate or angle blocks—or on bars used as depth gages for large diameter holes. The collet has 3/8"—32 male threads for mounting purposes.

Petz-Emery, Inc., Pleasant Valley, N.Y.

Use postpaid card. Circle No. 48

Abrasive Cutting Machine Now Features Power Head

The No. 14 Speed-Cut, previously available with only manual feed, is now available with a new power head. Simple, positive air controls produce uniform cuts due to steady, even wheel pressure. Cuts up to 4" pipe and shapes and 1½" rod stock are reported.



Hoffman Bits drill 5/8" spout hole and 11/16" (64 taper) center hole with just one simplified set-up.

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and here's the DIAMOND BITS FOR BIGGER PROFITS

. . . thin wall diamond surface set or impregnated bits for drilling and finishing the hardest materials

Hoffman Thin Wall Bits assure the highest production per bit available anywhere . . . because every bit is designed for the specific job. They produce the efficient, close tolerance results that cut job-time . . . eliminate many reject losses. Put Hoffman Bits to work and see why so many producers are setting new profit records in drilling and finishing glass, ceramics, porcelain, quartz, concrete and many others.

Scientific tests for hardness, cutting ability, etc. of customer's products are made in Hoffman's Laboratories at NO CHARGE. Send a sample of your own product material for testing at no obligation . . . or write for FREE literature.

Drilling Experts Since 1902

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jet plant demands "jet speed" deburring...

Rapid, effective, economical deburring is a must in a competitive high labor cost industry. GRIND-O-FLEX the *truly* flexible abrasive wheel, for contour finishing, consists of hundreds of "leaves" of abrasive cloth sealed to a core that wipe into and around hard to reach areas faster and more effectively than any abrasive method—hand or machine. GRIND-O-FLEX deburrs, removes flash and parting lines; will not "flat" or dig; finishes metals, plastics and stainless. Available in a variety of grits from very fine for satin finishing to very coarse for grinding. Attaches to your present rotary spindle power equipment. Sizes from 2" to 16" diameter. Requires no special experience or skill to produce a perfect finish. Investigate GRIND-O-FLEX today, write for FREE fully illustrated brochure describing GRIND-O-FLEX' many uses.

Photo courtesy Douglas Aircraft

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Announcing

FIBRECOOL

THIS WATER-SOLUBLE CUTTING FLUID HAS EVERYTHING

FISKE'S FIBRECOOL will help you lower costs through heavier cuts, higher speeds and longer tool life. Produces better finishes in both cutting and grinding. It's "WORK PROVEN".

- TRANSPARENT, DOESN'T HIDE WORK
- COOLS WHILE IT LUBRICATES
- ACTUALLY PROTECTS FROM RUST
- NO FOAMING, NO STICKING, NO GUMMING

Bulletins describing Fiske's Fibrecool and other specialty lubricants and coolants, sent on request.

FISKE'S *Since 1870*

METAL WORKING LUBRICANTS

FISKE BROTHERS REFINING CO.

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Plants: Newark 5, N. J. Toledo 5, Ohio

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Airetool Grinders Speed Production

ROUGH GRINDING

FINE FINISHING

When you want to take down rough spots, or speed up a tough grinding job on flat or curved surfaces, use Airetool Model 700-V pneumatic grinder, left above. It's easy to handle with 6" cup wheel or brush, available in 4500 or 6000 rpm models.

Model 500-V pneumatic sander (above, at right) is perfectly balanced for feather-edge accuracy in fine metal finishing. Takes 7" sanding disc. 3 models with 2300, 3000 and 4000 rpm speeds.

For full information about Airetool pneumatic production tools, write for Bulletin 67. Airetool Manufacturing Company, Springfield, Ohio.

BRANCH OFFICES: New York, Chicago, Tulsa, Philadelphia, Houston, Baton Rouge
REPRESENTATIVES in principal cities of U.S.A., Canada, Mexico, South America, England, Europe, Puerto Rico, Italy, Japan, Hawaii.
EUROPEAN PLANT: Vlaardingen, The Netherlands
CANADIAN PLANT: Brantford, Ontario

AIRETOOL MANUFACTURING COMPANY SPRINGFIELD, OHIO

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It is easy to operate the unit—just put material in vise, push down on vise handle, press trigger on handle, and down comes the power head.

The "V" vise, with chain hold-down, is said to grip an unlimited variety of shapes and permit "ganging."

Non-ferrous material is cut with a 14" steel saw using an automatic mist oil spray. Ferrous materials are cut with a 14" abrasive wheel.

The Speed-Cut Div., Beaver Pipe Tools, Inc., Warren, Ohio.

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Feeder Screens and Feeds in One Operation

The SF-115 small capacity screening feeder, for the efficient, rate-controlled simultaneous screening and feeding of dry bulk materials, has the reported advantage of 3600 vibrations per minute producing sufficient particle agitation to insure fast, efficient separation. This electromagnetically powered unit is said to offer clog-free feeding.

The model also features finger-tip control of the power of vibration which determines the rate of separation and the rate of feed. Its operation can be regulated to meet production requirements or adjusted to the best flow and separation characteristics of the material being handled.

Because of effective vibration and its easy power-of-vibration control, the unit is said to be readily adaptable to handling a variety of materials.

Syntron Co., 1253 Lexington Ave., Homer City, Pa.

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Lapping Unit Features Advanced Pneumatic Lifts, Pressure Arms

The Spitfire 24" Gyromatic flat lapping machine is now available with specially designed pneumatic lifts and

pressure arms to provide fast, easy loading and unloading of piece parts while adding important operational features.

The design creates less wear and strain on the air cylinder and its components to give longer life to the complete cylinder assembly, the manufacturer reports. The hardened ground steel support columns act both as support and guide for the pressure arms. This action holds the parts retainer rings during the actual lapping cycles.

For parts removal, the entire unit including pressure arms and work rings simply swivel off the lapping plate.

A turn of the handle at the end of the pressure arm moves the parts retainer ring and its components in or out enabling lapping plate correction as desired. Direction of adjustment is indicated by a graduated scale and pointer.

Spitfire Machine and Tool Co., 2931 N. Pulaski Rd., Chicago 41, Ill.

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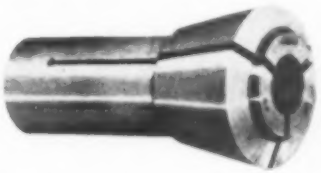
Steel Collets for Jacobs Chucks

Round, hexagon and square steel collets are now available for users of Jacobs spindle nose chucks. Also available is a steel emergency collet with soft face and pilot hole to permit rapid



boring and stepping out when in place in the chuck.

Advantages claimed for the collets are providing full bearing and better grip, eliminating plugs when holding short length, and ⅛" pilot nose brings work holding surface closer to cutting tools.

Round sizes are priced at $9.75 each.

Hardinge Brothers, Inc., Elmira, N.Y.

Use postpaid card. Circle No. 54

Which backing would you specify ...and why?

In the above picture, the backing on the abrasive belt at right is Jeans, a lightweight, flexible cloth used chiefly in woodworking applications. The Drills cloth backing on the left is a heavy, extremely durable cloth used for all types of metal grinding operations. They are but two of many different types and weights of cloth, paper, fibre, and combination backing materials. Choosing the *right* one for your particular application can make a big difference in your product finishing costs. Which is why more and more manufacturers turn to the expert recommendations of Jewel Brand Abrasives Engineers. If the right choice is up to you, call on them for the backing you need. Write for details. Abrasive Products, Inc., 517 Pearl Street, South Braintree, Mass.

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ABRASIVE PRODUCTS, INC., South Braintree 517, Massachusetts

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ENGINEERED INSTALLATION BY MID-WEST MEANS EXTRA BENEFITS AT NO EXTRA COST

It takes the correct abrasive, properly installed, to meet the production requirements of both time and quality. The product sales engineers of Mid-West will help you choose the right abrasive to meet *your* particular requirements, in *your* own plant, on *your* job . . . whether it be old applications, new set-ups or quality control. These highly trained abrasive specialists are backed by the constant research and testing of the Mid-West Abrasive Company in their efforts to meet and exceed the demands of the ever-changing industrial scene. Your call will bring you one of these skilled men without obligation.

Mid-West is one of only three abrasive companies offering customers a complete line of abrasive products: sandpaper, grinding wheels, honing stones, abrasive grain and grinding machines.

MID-WEST ABRASIVE CO.

510 S. Washington St. • Owosso, Michigan

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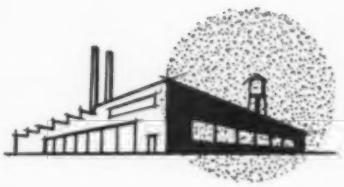
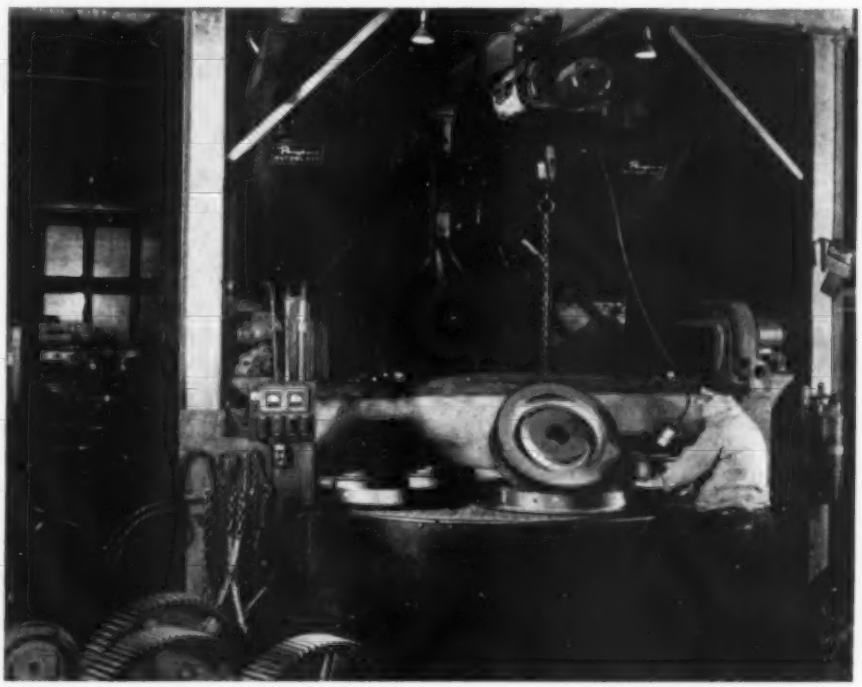


News from the Industry

Rotoblast Table Boosts Gear Cleaning Capacity



A tough production problem at the Tool Steel Gear & Pinion Co., Cincinnati, Ohio, has been solved with a versatile blast cleaning table that has cut cleaning room man-hour requirements by two-thirds—from three shifts a day to one shift a day.

Tool Steel Gear manufactures high quality, special heat-treated plain carbon and alloy steel gears and pinions. To match a day's production of heat treated forgings with sufficient cleaning equipment to remove the stubborn iron oxide scale, they were operating an airblast room three shifts per day. This firm also has other projects they undertake. Presently, 1.5 million lbs. of steel per month are being carburized. Two-thirds of this requires cleaning.

Because of the wide range of sizes and shapes to be cleaned, a 9 ft. LG-14 Rotoblast Table, manufactured by the Pangborn Corp. of Hagerstown, Md., was selected to replace the airblast room. It was estimated that two shifts would be needed to Rotoblast the work. So far the machine has been able to handle everything easily in one shift. The machine is cleaning approximately 39,500 lbs. of the very hardest heat-treated steel in an eight-hour shift.

General Foreman George Rebeck has also found that Rotoblast has improved the appearance of their products to a very great degree and improved selected machinability.

J & L Offers Comparator Owners Certified Maintenance Service

Reasoning that an ounce of prevention is worth much more than a pound of cure, Jones & Lamson Co. of Springfield, Vt. has brought out a new service and maintenance policy for owners of its optical comparators.

"This approach to constant service is new to the field of optical inspection," stated Harold Murch, Comparator Sales Manager, "and is in answer to a definite need." He went on to point out that one of the desirable features of the new J&L Certified Maintenance is the written, dated certificate of precision for each comparator given to the owner of the comparator after each of the four-per-year inspections by J&L trained specialists. This will fulfill completely all government specifications for written certification on gages used on government contract work.

Details of this plan may be obtained from any J&L district office or by writing to the Comparator Div., Jones & Lamson Machine Co., Springfield, Vt. Similar service on the California West Coast is offered by J&L agents, Germain Machinery Co. of Los Angeles, and Moore Machinery of Berkeley.

Facilities Modernized By Armour Coated Abrasives

The Armour Coated Abrasives Division, Armour and Co., Alliance, Ohio, is nearing the completion of a three-year program involving the extensive modernization of all coated abrasive manufacturing facilities. These facilities incorporate the latest and finest engineering features and techniques available, and will provide a full range of superior coated abrasive products for the many industries serviced by this Division.

In the near future, these improved coated abrasives products will be nationally merchandised and marketed under the registered tradename "Armour-Clad."

A FREE COST-CUTTING CONSULTANT

Your local Industrial Distributor has gained wide experience in serving many industries and in providing solutions to a variety of production problems. His service begins with an idea — a cost-cutting idea in the form of a product or method which he is willing to suggest at no charge to you.

A COST-CUTTING TOOL

He frequently recommends Anderson wire brushes for those jobs requiring production efficiency with top quality results.

For lowest cost per unit processed select: Anderson.

Write for complete catalog of wire brushes with detailed selection and operation data.

Anderson

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1052 Southbridge Street
Worcester 10, Mass.
Use postpaid card. Circle No. 243

Clinic on Grinding With Van Norman Machine Tools

View of operating exhibit of the Van Norman 2C Diversimatic centerless grinder, sponsored by the Chas. A. Strelinger Co. of Warren, Mich.

More than 400 metal working executives attended a very successful demonstration clinic held recently by the Chas. A. Strelinger Co. of Warren, Mich. The clinic featured the new Van Norman 2C Diversimatic centerless grinder in operation. The Strelinger Co., distributor of Van Norman machine tools, arranged the exhibit as part of a program designed to acquaint top metal working executives with the newer, faster, cost-saving ideas, made possible by using Van Norman equipment.

The clinic graphically demonstrated that the profitable replacement of out-of-date machinery is not only possible, but absolutely necessary under today's extremely competitive conditions.

The Van Norman centerless grinder on demonstration was equipped with a crush dressing unit wheel, automatic infeed, a chiller used to refrigerate the coolant, a Precipitron and magnetic filters. These five features and advancements in machine tool design were the subject of much comment and a question-and-answer discussion during both the afternoon and evening sessions of the four-day clinic.

A similar type of demonstration clinic will be held by the Garco Machinery, Inc., also a distributor of Van Norman machine tools, at their plant at 21000 St. Clair Ave., Cleveland, Ohio, on March 24 through 27.

Five Engineers Chosen for Wheelabrator Fellowships

The Board of Awards of the Foundry Educational Foundation has announced the presentation of five $1500 Wheelabrator Graduate Fellowships for 1959. The five young engineers, who will begin their graduate studies this coming September, are **Robert G. Liptai**, St. Louis, Mo.; **Ernest J. Poirier**, Medford, Mass.; **James H. Steele**, Blacksburg, Va.; **Thomas S. Piwonka**, Cleveland, Ohio, and **Charles A. Rowe**, Coraopolis, Pa.

The Wheelabrator Foundation, in cooperation with the Foundry Educational Foundation, established the Wheelabrator Foundry Educational Program in 1958 to provide 50 Fellowships valued at $1500 each during a 10-year period.

This program is open to men who are not over 28 years of age on the day of application and who are either a senior undergraduate or graduate student registered with the F.E.F., or a returning veteran who was either registered with the F.E.F. or had been employed in the foundry or an allied industry. Also eligible are otherwise qualified young men who are currently employed in the foundry industry.

Applications are now being accepted from those desiring to begin study in September, 1960. The deadline for applications is December 31, 1959. Application forms and further information may be obtained from the Foundry Educational Foundation, Terminal Tower Bldg., Cleveland 13, Ohio.

Allis-Chalmers Safety Campaign Reduces Accident Frequency

A new low accident frequency rate of 4.0 was posted by Allis-Chalmers in 1958, a reduction from 6.2 in 1957. The rate of 289 was well below the 513 mark of 1957.

One of the reasons for the company's successful 1958 safety record is attributed to a "'Knowing's Not Enough" campaign which stressed the importance of practicing the safety techniques learned in the past, both at work and home.

The promotion continues into 1959. Identified by the slogan "Use Your Know-How," it retains the failure caution flag of the auto racing fraternity. Safeguarding against falls keynoted the campaign in February, followed by good housekeeping in March and safe material handling in April.

Brown & Sharpe Opens Cutter Service Co. in Illinois

Another milling cutter grinding and modification service company has been opened in Illinois by the Cutting Tool Division of Brown & Sharpe Mfg. Co., Providence, R.I.

The Brown & Sharpe Cutter Service Co. of Illinois is located in Bellwood, in metropolitan Chicago. It is staffed by factory trained cutting tool specialists devoted to fast, dependable service on resharpening or modification of cutters and end mills.

Black & Decker Open Branch in Manhattan

To meet the increased demand for additional service facilities to users of their electric tool products in the Manhattan area, The Black & Decker Mfg. Co. of Towson, Md. announces the opening of a new factory service branch at 227 Varick St., New York City. The new branch will supplement the service facilities of the company's present factory sales and service branch at 56-15 Queens Blvd., Woodside.

Dan E. Calabrese has been appointed Assistant Branch Service Manager of the company's new Manhattan Branch, which is under the over-all supervision of Walter Trapp, Black & Decker New York Branch Service Manager.

Elgin Abrasives Appointments

Elgin Abrasives Division of the Elgin National Watch Co., Elgin, Ill., has appointed two new Sales Managers.

Robert DeDobbelaere has been named Product Sales Manager-Carbide Tools for the Division. He will direct sales of "Golden Circle" solid carbide rotary tools, with special emphasis on distributor promotion and procurement. **Jack Wiziarde** is now District Sales Manager, directing sales of the Division's industrial diamond products and solid carbide rotary tools in Ohio, Upper New York State, Western Pa., W. Va., Va., and the Carolinas.

DeDobbelaere joined Elgin in 1952 and had been assigned as District Sales Manager in the Ind., Ky., Tenn. and Southern States area. Wiziarde came to the firm in 1952 also, and was assigned as Sales Engineer in Ohio in 1956.

Robison Elected President of Wheel Trueing Tool Co.

H. E. Robison has been elected as President and Treasurer of Wheel Trueing Tool Co. of Detroit, succeeding **H. B. Wallace,** Founder and President of the company since its beginning in 1910, who becomes Chairman of the Board. **R. S. Fowler,** who has been a Vice-President of the firm, becomes Vice-Chairman of the Board.

Re-elected Vice-Presidents are **Donald J. Wallace,** Manufacturing, and **Harry W. Wallace,** Diamond Drilling Division. **James H. Dillow** has been re-elected Secretary, and **Miss E. F. Welsh** has been re-elected Assistant Secretary and Assistant Treasurer. **Harry W. Wallace** is President of the Canadian subsidiary, Wheel Trueing Co. of Canada, Ltd.

Robison has been affiliated with Wheel Trueing since 1919, and has been Treasurer of the company since 1932. Fowler joined the company in 1921, and has been a Vice-President since 1932.

The company celebrates its fiftieth anniversary in 1960 and looks forward to another era of growth with the industries it serves.

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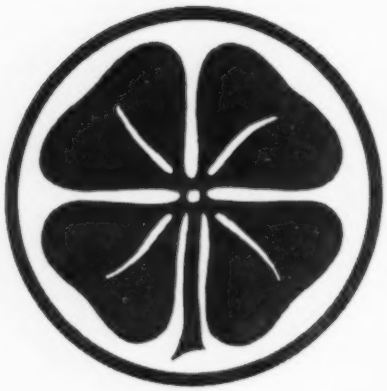

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But we all need reminding, especially when new processes or products are being developed, that abrasive compounds often provide the most economical as well as the most accurate method of producing specified surfaces or shapes. Lapping or grinding with compounds offers many possibilities for tools and dies as well as for precision end-products. A check of available grains, vehicles, and methods before tooling up can be rewarding. Grains come in a full range of grit sizes, the viscosity of the vehicle is adapted to the required application, and the compound may be grease-mixed or water-soluble.

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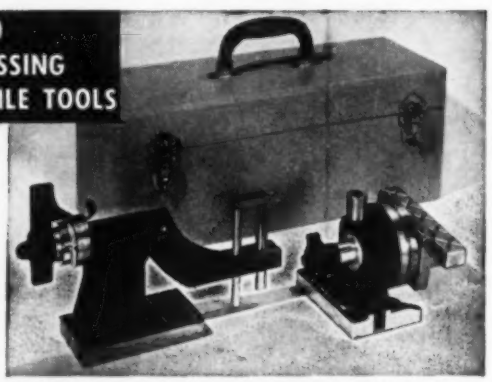

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(Both tools including diamonds)

The G-5 RADIUS DRESSER is a precision engineered tool that will dress either a convex or a concave radius from .015" to 1.750" on a 7 inch or 10 inch wheel, and it may be set to the exact radii desired. Graduated stops allow you to dress any desired portion of a radius. The spring tension journal insures chatter free operation. The G-2 ANGLE DRESSER AND TOOL HOLDER is actually two tools in one, having an easy to read vernier scale 0° to 180° giving accuracy within 2" of 1°; an excellent time saver to set up small jobs to be milled, drilled, tapped, etc., on any desired angle.

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Now you can purchase either the G-5 Radius Dresser or the G-2 Angle Dresser and Tool Holder separately if you so desire. (Without storage boxes)

G-5 Radius Dresser complete with diamond $80.00.

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Replacement diamonds are always available for our units at a reduced price. Diamonds for the G-2 $5.00 each; diamonds for the G-5 $8.00 each.

Distributorship available in select territories

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Bergstrom Elected Pres. of Cincinnati Milling & Grinding

S. E. Bergstrom

R. C. Bevis

Swan E. Bergstrom has been elected President and **Robert C. Bevis** a Vice-President and Director of the Cincinnati Milling and Grinding Machines, Inc., the sales subsidiary of The Cincinnati Milling Machine Co.

Bergstrom has been associated with Cincinnati Milling since 1927 and Bevis started as a University of Cincinnati co-operative student in 1938. Both have held many important positions, Bergstrom being President of the parent company and Bevis Sales Manager of the sales subsidiary company.

O. S. Buckner, Founder of Bay State Abrasives, Retires

O. S. Buckner

Orello S. Buckner, one of the three founders of Bay State Abrasive Products Co. of Westboro, Mass., has officially retired from all active participation in the company's operation. He remains as Chairman of the Board of Directors.

Ever since the company was organized in 1922, Buckner has been its President, which position he relinquished in June, 1958.

From its beginning in the town of Westboro, and under the inventive mind and guidance of Buckner, the company has grown and prospered to the position of third largest grinding wheel manufacturer in the United States and Canada with sales outlets including many South American and European countries.

A graduate of the University of Illinois, Buckner worked for the Norton Co., Worcester, from 1916-1922 in their Research and Development program.

GE's Metallurgical Prod. Dept. Appoints Dr. Reed Gen. Mgr.

Dr. Charles E. Reed has been named General Manager of General Electric Co.'s Metallurgical Products Dept. in Detroit. He succeeds **Kenneth R. Beardslee**, who, as General Manager since 1951, led the Detroit General Electric unit to a prominent position nationally in the manufacture of several products. Beardslee, 58, becomes a consultant for the department. He currently is in Europe investigating manufacturing techniques, distribution and

C. E. Reed

K. R. Beardslee

use of permanent magnets, cemented carbides and industrial diamonds.

Dr. Reed has been General Manager of the Silicone Products Dept. of General Electric, Waterford, N.Y. for the past seven years. He joined GE as a Research Associate in the Research Laboratory in Schenectady, later heading the chemical engineering organization of that laboratory. He became Manager of the Chemical Engineering Dept. in 1945 and General Manager of the Silicone Products Dept. in 1952.

Three Executives Named to P & W Posts

Three executives were assigned to new positions at Pratt & Whitney, West Hartford, Conn.

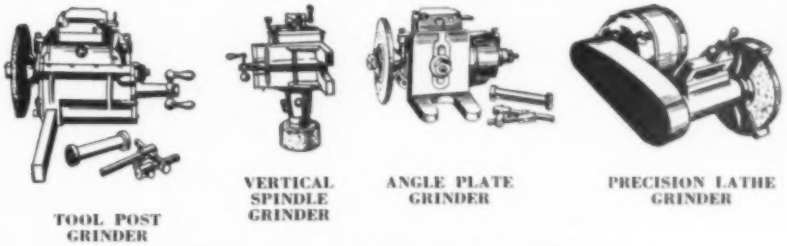
Jacob J. Jaeger, formerly Vice-President in Charge of Engineering, is now Executive Vice-President. **Henry J. Fredericks**, Treasurer-Controller, has been named a Vice-President. **Edward J. Shages**, formerly Vice-President and Manager of the Cutting Tool and Gage Division, is Vice-President in Charge of Manufacturing for all operations.

Jaeger has been associated with the company since 1940, a Vice-President since 1955, and was elected a Director in 1956. Fredericks has served as Treasurer-Controller since April, 1957. Before joining P & W in October, 1955, he was associated with the accounting firm of Frazer & Torbet. Shages has risen through company ranks, starting his career in 1929 as an apprentice.

Officer Changes at Barnes Drill Co.

H. L. Cogswell has been elected Vice-President in Charge of Sales and Service Activities of the company's machine tool, coolant cleaning equipment, and honing divisions. **Roger Marriott**, Executive Vice-President of the firm, has been elected Secretary and Treasurer

• for FASTER . . . EASIER . . . MORE ECONOMICAL GRINDING



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NEWS OF INDUSTRY *continued*

H. A. Johnson

L. Oppenheim, Jr.

to succeed **Alfred G. Block** who is retiring. **Harold A. Johnson** has been named Vice-President in Charge of Engineering and Manufacturing.

Cogswell has been associated with the firm since 1933 and has served as Manager of Sales Engineering, and as General Sales Manager. Johnson has been associated with the company since 1938, and has served in various engineering and production capacities. Block, Vice-President and Secretary-Treasurer, has retired as of February 1, after nearly forty years of service with the company.

Laurent Oppenheim, Jr., of New York City has been elected a Director and appointed Vice-President-Finance of Hanson-Van Winkle-Munning Co. of Matawan, N.J. He is also Chairman of the Finance Committee of Resistoflex

H. F. Tolnitch

T. E. Douglass

Corp. and Chairman of the Executive Committee of Greer Hydraulics, Inc.

The appointments of **Harold F. Tolnitch** as Sales Manager of Machine Knife Products and **Thomas Earl Douglass** as Sales Manager of Grinding Wheel Products was announced at the fifth annual sales meeting of Simonds-Worden-White Co., 1101 Negley Place, Dayton 7, Ohio.

Since joining the firm in 1955, Tolnitch has been serving as Assistant Sales Manager. Previous to that time he was an Industrial Gas Engineer with the Dayton Power and Light Co. Douglass was Assistant to the President of the company prior to his appointment. Previously, he was associated with the Vernay Laboratories as Sales Manager responsible for product development and technical sales.

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DIAMOND WHEELS
(FOR WET GRINDING)

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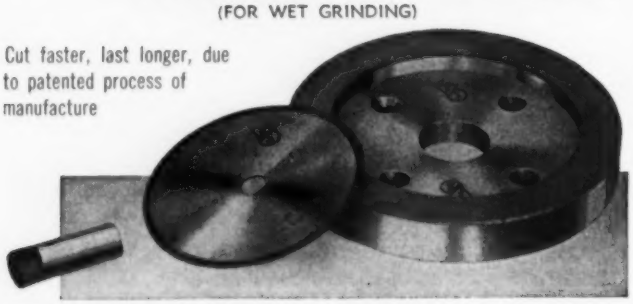

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In standard and special sizes and shapes for:

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Generating	Ceramics, Porcelain
Pencil edging	Sapphire
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W. D. Pollard

R. D. Neighbors

William D. Pollard has been appointed an Abrasive Engineer by Norton Co. of Worcester, Mass., and will call on accounts in western Mo. and northwestern Ark. **Richard D. Neighbors** has been named a Field Engineer at the St. Louis district office.

Pollard has been a Field Engineer at St. Louis since last July. Prior to joining Norton in 1957, he was a tool and gage maker at the U.S. Defense Corp. Neighbors recently completed the sales training course. Prior to coming to the firm, he was a salesman for the General Tool Co.

F. W. Welling

W. L. Hardy

Frank W. Welling has been elected Vice-President of the Commercial Filters Corp. of Melrose, Mass. He will have broad responsibility for the administration of the company and sales of its products which include a wide variety of industrial filtration equipment. For the past four and one-half years, Welling has served as Vice-President and Director of W. A. Case & Son Manufacturing Corp., Buffalo, N.Y.

Warren L. Hardy has been appointed Manager of Marketing Research for Abrasive Products at Norton Co., Worcester, Mass. He was formerly Manager of Business Research.

Hardy joined the firm in 1939 after graduation from Worcester Polytechnic Institute, and has served in varied capacities through the years, with time out for service in World War II.

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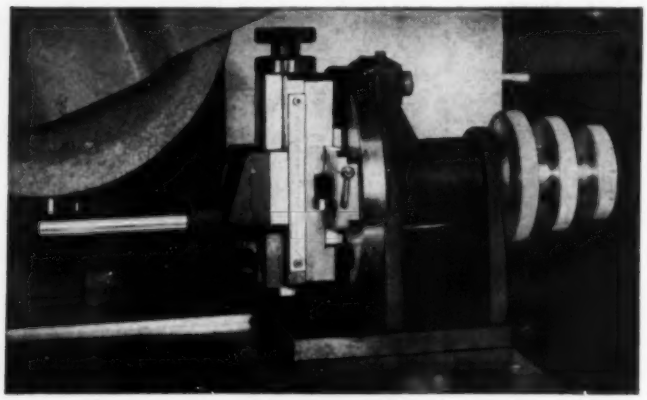
T. Trowbridge

T. G. Gilcoyne

Thomas Trowbridge has been named General Sales Manager of the Coated Abrasive Division of Behr-Manning Co., Troy, N.Y. **Thomas G. Gilcoyne** was appointed Field Sales Manager of the Division.

Trowbridge has been with the Troy firm since 1922, occupying progressively important sales posts in this country and, for two years, in England. Gilcoyne has been a member of the Sales Department since 1937, except for service as a Navy lieutenant during World War II. He has served as New York Divisional Manager, was Manager of General Trades Sales from 1954 to 1957, and became Manager of Industrial Sales last year.



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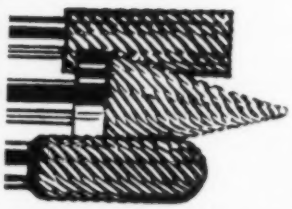

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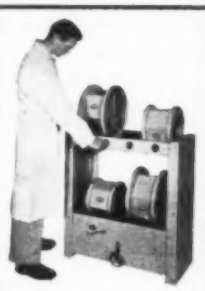

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Gives narrower, smoother cuts on industry's toughest materials

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Now... at *production prices*... DIATRONIC gives you a rim width of .006" that's accurate to a maximum total tolerance of .0005"—or your money back. This accuracy is built in by a new process. No break-in needed. New narrow cut reduces sawdust loss 30%. A must for $3,000-a-pound silicon or germanium crystal. Cuts tungsten carbide, corundum, aluminum oxide, glass... practically anything. Stock orders shipped in hours; special wheels available. Write for literature, price list.

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portable—easily installed

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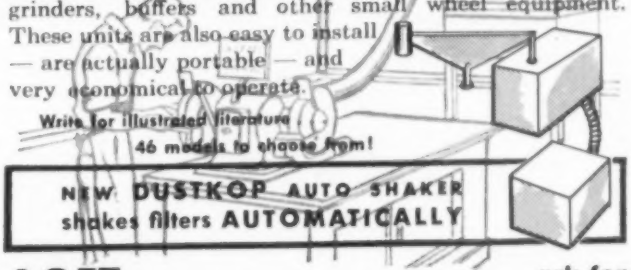

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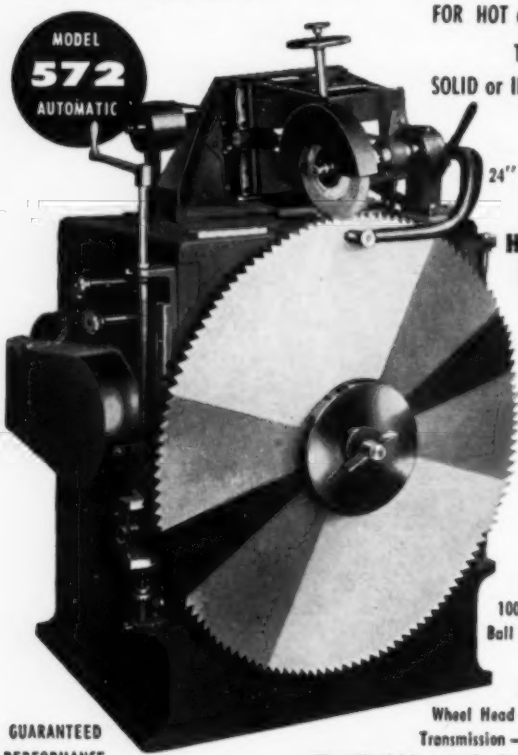

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The Grinding Wheel

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A Final Thought

Business Battles Balanced Budget

For years we all complained over the government's inability to hew the line on the budget. Nasty things were said and written about the Administration. "Those fellows down on the Potomac just don't know the economic facts of life. Ought to be in business. Learn what it's all about," it was said. And the budget wasn't balanced and deficit spending didn't stop and grumbling from businessmen continued.

But things are different now. The Administration is engaged in a bitter battle with business for a balanced budget. One expects labor and the vet organizations to scream for handouts, but one doesn't expect the businessmen—who were so anxious to teach the economic facts of life to the fellows on the Potomac—to be so lacking in economic savvy that they too are complaining about the budget. To balance a budget someone must be left out, some pet idea must be shelved, other projects must be content with less. This is a bad thing, the businessmen say. Cut back the other guy, but spare me and mine. A person no less than Secretary of Commerce Strauss recently pleaded with a group of businessmen "to take a one year moratorium on support for any program for Federal expenditures which are not in the President's budget, even if your industry or your locality is an intended beneficiary."

Matters have come to such an interesting point that the president of one company went to Washington and claimed he was so busy developing new products and spending so much money on research that he had nothing left over to educate the consumers and therefore the government ought to give him money for an educational job to show customers the benefits of his products!

The shipping people want bigger subsidies, the home builder wants bigger aid for financing, the airlines want more for airports . . . everybody wants more. One wonders if this is the land of free private enterprise or the land of free private handouts. If some businesses are unable to operate profitably in this stern world without subsidies maybe they ought to get into another line of work or change the economic system and perform in a socialized state.

And yet it's human nature to want something for nothing. Whether it's labor, business, you or me, or the housewife who collects soap coupons for a free bar of soap we're all mouth and hands for something for nothing. The horrible thing about all this is the final reckoning. Ah, then the wailing begins all over again. Taxes are too high. "Fellows down on the Potomac," etc. You know the chorus. Not only do you know the chorus, but some of the fellows who've been getting the biggest handouts sing solo obligatos in fearful protest over taxes. All real sad!

While the continuing cries for handouts continue, another aspect should give us serious qualms: to what extent is our moral fibre being whittled away and made soft? To what extent are we becoming a nation of greedy babies believing that the government owes us a living? Is our character being turned into jelly by our screams for something for nothing? One cannot help but view the future with some apprehension.

Wm. J. Schleicher

Vice President & Editorial Director

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